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Insects

A PROPOSAL FOR THE RESTRICTION OF THE USE OF THE TERM SUBSPECIES

by G. VAN SON, F.R.E.S.

Much has been written lately concerning the danger to our present system of trinomial nomenclature arising from the indiscriminate use of the term **subspecies** when defining more or less uniform geographical populations of species of wide distribution. Not a few disparaging remarks have been made at the expense of over-zealous entomologists who have been increasing the already enormous number of "subspecies", whereas in fact they have only followed the example given by specialists in other branches of zoology, particularly, though not exclusively, those concerned with the study of higher vertebrates.

Very able criticisms of the present-day chaos in subspecific nomenclature have been offered by Mayr, Linsley, & Usinger (1953), Wilson & Brown (1954), Burt, Sibley, Bogert, Hubbell, & Clench (1954), and Edwards (1954), and remedies suggested, some of which would appear to be unjustified, as they would penalize guilty and innocent alike. Surely, to do away with trinomial nomenclature would not represent an advancement, and such action would not be required if the "subspecific house" was put in order by some action of the I.C.Z.N. before it is too late. At its Paris meeting in 1948, the International Commission separated specific and subspecific categories from categories below the rank of subspecies, but failed to give an unequivocal definition of subspecies which would safeguard the proper use of the term in future.

The old definition of a subspecies as a "geographical or host variation" is very vague, because populations of a climatically (and often also seasonally) variable species of wide distribution often present local "population characters" in accordance with prevailing external conditions, quite independent from the presence or absence of isolation which alone can maintain distinctions of a genetic (mutational) nature. Such non-isolated "regional" populations have been lately treated as subspecies, *e.g.* by TALBOT in Pieridæ and by REHN in Orthoptera, to mention only a few cases.

Such treatment of clear cases of clinal variation as subspecies does not permit exact identification of specimens from "intergradation zones" and simply invites new would-be systematists to increase the already unwieldy number of described "subspecies" by adding still more "intermediates between intermediates", and so *ad infinitum.*

The fault, in my opinion, lies with the central authority which appears to allow too much individual interpretation to be placed upon the term **subspecies**. "Let freedom reign" may be a convenient slogan in politics, but should be used with caution in science if any degree of consequence and uniformity is to be achieved.

MCATEE'S definition of a subspecies, as quoted by DE LA TORRE BUENO in *A Glossary of Entomology* (1937), and that of FERRIS, quoted in the same work, refer unmistakably to cases of clinal variation which, as has been pointed out above, may be caused by external causes and not by genetic differences. FERRIS' statement that "the essence of subspecies is intergradation, assumed or actual", postulates the acceptance of any part of a cline as a subspecies and furthermore asks us to assume intergradation in cases where it has been found not to exist, as, for instance, in completely isolated island or high mountain populations characterized by constant distinctions of a genetic (mutational) nature.

To illustrate the case, let us consider the several clearcut and completely isolated subspecies of the African *Papilio ophidicephalus* Oberth., the nominotypical subspecies of which occurs in Tanganyika. The subspecies *chirinda* occurs from the high mountain forests of the Eastern Border of Southern Rhodesia down to the coastal forests of Portuguese East Africa and is completely constant in appearance and minor genitalic characters throughout the whole distributional area, from over 6,000 feet elevation to sea level. It is separated from the next subspecies, *entabeni,* of the Zoutpansberg range in the Northern Transvaal, by a complete barrier of lowveld thorn country over 100 miles wide, where the species can not exist because of the absence of its foodplant and adverse climatic conditions. The next two subspecies, *transvaalensis* and *ayresi,* are separated from *entabeni* and from each other by similar gaps. The coastal subspecies, *phalusco,* on the other hand, extends from the Eastern Cape forests near Kingwilliamstown to the Karkloof forest of Natal, a distance of over 300 miles, and is just as uniform in appearance as the abovementioned mountain subspecies, although its wide distributional area presents extremes of temperature and relative moisture from the cold and misty Pirie Forest in the Cape to the warm tropical climate of the Durban area. Any specimen of any of these subspecies can be identified without reference to the label, with an exactitude of 100%, as no intermediate specimens appear to exist in nature. Taking the above in consideration, it must be stated emphatically that since no intergradation appears to exist in nature in these cases, it would be erroneous and scientifically wrong to assume its existence.

It has been stated by various systematists that species (and subspecies) in nomenclature do not necessarily correspond to species (and subspecies) in nature. This statement, though unfortunately true on account of the shortcomings of our nomenclatorial practice, seems to point an accusing finger at those who are responsible for the formulation of laws governing the application of nomenclatorial rules.

In order to give the term **subspecies** a definite and uniform meaning throughout zoological nomenclature, I would like to suggest that the I.C.Z.N. should consider amending the old definition given by the British Commission on Nomenclature, to read as follows:

"*A subspecies is a population variation conditioned by geographical or host isolation*".

Such a definition would automatically preclude parts of a continuous cline from being assigned subspecific names, and would also eliminate from consideration as subspecies all reversible variations caused by random changes of hosts in parasitic species, where such changes do occur.

I certainly agree with WILSON & BROWN that in cases of complete reproductional isolation of island populations, it would be sometimes difficult to ascertain, without cross-breeding experimentation, whether any of such isolated populations have already reached the specific status, that is, if they have attained complete intersterility. Far from being an impediment, this would reflect the position in nature where no clear-cut distinctions can be drawn between subspecies and closely related allopatric species, the latter being gradually derived from the former, the degree of difference being a function of the duration of complete isolation and of the mutational rate of the species in question. Moreover, the co-ordination of specific and subspecific names would reflect the actual co-ordination of species and subspecies in nature.

Obviously, a drastic step of this kind would meet with much resistance from those who are content to accept as subspecies any more or less phenotypically uniform population, but there seems no other way of avoiding complete chaos in nomenclature in the very near future.

The only difference in practice would be that, should a Latin or latinized name for a part of a cline be deemed desirable, it would be required to interpolate an abbreviation (*e.g.* "f." for "*forma*") between the specific name and the name of the population form in question in all those cases where no completely isolated subspecies appear to exist. In this way, the number of recognizable subspecies would be greatly reduced, and much unnecessary confusion avoided.

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STUDIES IN FOODPLANT SPECIFICITY.

1. THE SUITABILITY OF SWAMP WHITE CEDAR FOR *MITOURA GRYNEUS* (LYCÆNIDÆ)

by CHARLES L. REMINGTON and ROGER W. PEASE, JR.

INTRODUCTION

The processes of evolution of foodplant specificity in insects are very little understood. It is difficult to bring out more than thinly supported hypotheses because of the scantiness of precise knowledge of even the most essential details of insect-foodplant relations. The task of discovering a usefully large body of such knowledge could be in no better hands than those of several lepidopterists, in any or all parts of the world, carrying on their favorite pastime of rearing Lepidoptera but with the guidance of the experimental method and comparative observation.

As DETHIER (1953, 1954) has explained, an unsuitable foodplant may be 1) nutritionally inadequate and not have all the components required for normal growth of the insect, or 2) it may contain toxic substances which poison the insect, or 3) it may be physically inedible—too hard, too dry, etc., or 4) it may have repellent odors or tastes which drive away the ovipositing female or the larva. Once a plant has been proved unsuitable, the cause should be determined; one might expect toxicity to be the quality in most instances. First, however, the suitability of any plant as food for an insect species should be fully explored. There are various points in the life-history of an insect at which unsuitability may be expressed. 1) The first instar larvæ might simply refuse to feed. 2) These larvæ might feed but soon die. 3) Some growth might occur, but death results before the larva becomes fully grown. 4) The foodplant might cause death during pupation or emergence from the pupal shell. 5) The species might develop fully on the plant, but the resultant males or/and females are sterile. **A full test of the suitability of a plant requires that the larva be reared solely on that plant and that the adults be induced to mate and lay eggs which then hatch.**

Among the most fascinating and potentially illuminating instances of foodplant specificity are the pairs or groups of extremely closely related species ("sibling species") in which each species is confined to one exclusive foodplant. The sibling pair, *Mitoura gryneus* (Hübner) and *M. hesseli* Rawson & Ziegler, is one of the newest to become known. *M. gryneus* is widespread in North America (including its probable western races *M. siva* (Edwards) and allies) and is only known to feed on Red Cedars, *Juniperus* spp.; a report of *Smilax* appears to be incorrect. Its sibling, *M. hesseli,* is known only from the eastern coastal area of the U.S.A., always near swamps full of Swamp White Cedar, *Chamæcyparis thyoides* (L.) BSP., and in confinement it has been reared successfully on *C. thyoides* (Rawson, Ziegler, & Hessel, 1952). Larvæ of *M. gryneus* have been found on *Juniperus,* but wild larvæ or ovipositing females of *M. hesseli* have not yet been reported. An opportunity to gather certain new data on *M. gryneus* was accepted, and the results are set out below.

A FOODPLANT EXPERIMENT WITH *M. GRYNEUS*

A female *Mitoura gryneus* was collected on *Juniperus virginiana* L. at New Britain, Connecticut, on 30 April 1954. The next day it was confined over a sprig of *J. virginiana* and soon laid a number of eggs. The larvæ emerged 16-17 May, and on 18 May eight of the new larvæ were placed on fresh *Chamæcyparis thyoides.* The remaining larvæ (about fifty) were left on the *Juniperus.* No special attention was given to the larvæ on *Juniperus,* and on 14 June, when the first larva pupated, there were only seven others alive and healthy; the low survival was probably due to an occasional lack or poor condition of the foodplant. By 14 June none of the larvæ on *Chamæcyparis* had pupated, but six of the original eight were still alive and healthy. In all, eight *Juniperus* larvæ and six *Chamæcyparis* larvæ proceeded to pupate.

Our next precise record of these *Mitoura* was made on 10 July 1954, when imagoes had emerged from all six of the *Chamæcyparis* pupæ (four ♂♂, two ♀♀) and from seven of the eight *Juniperus* pupæ (three ♂♂, three ♀♀, and one which escaped). The other *Juniperus* pupa failed to hatch at all. By this point it had been shown clearly that Swamp White Cedar (*Chamæcyparis),* the normal larval food of *Mitoura hesseli,* is essentially as suitable for the development of *M. gryneus* as is its normal foodplant, Red Cedar (*Juniperus*).

This result in itself was perplexing to us, and it became important to test the possibility of nutritional sterility in the *M. gryneus* reared on *Chamæcyparis.* Apparently very little has been done with mating of Lycænidæ in the laboratory, and we had no precedent or experience to guide us in attempting to induce copulation. However, a simple system, which is consistently successful with *Colias,* was used with the *Mitoura.* The four males and two females reared on *Chamæcyparis* were confined together in bright sunlight late in the morning on 8 July. At 12:20 P.M. (Eastern Daylight Time) a pair was found *in copulo* and was separated from the other *Mitoura.* The pair was seen to separate at 12:39. This female was confined with a fresh sprig of *Chamæcyparis* in a small bottle (about 420 cc.), and from 9 to 13 July it laid approximately 55 ova on the plant. Ten ova were selected at random and isolated for observation. From nine of these, larvæ emerged; the tenth was found to contain a fully developed but dead larva. Thus it had been proven that at least in Connecticut there is probably no nutritional sterility in *Mitoura gryneus* caused by *Chamæcyparis.* The only male and female tested each must have been fully fertile. No effort was made to test fertility in *M. gryneus* reared on *Juniperus,* since the abundant field and laboratory experience of the writers and many other lepidopterists, with *M.*

gryneus females which had undoubtedly developed on Red Cedar, served as satisfactory proof of the suitability of *Juniperus*.

CONCLUSIONS

The above experiment, begun as a simple test which was confidently expected to show the unsuitability of *Chamæcyparis* as a larval food for *M. gryneus,* has produced results entirely unexpected to us. It underlines many more questions than it answers. The case of *M. hesseli* and *M. gryneus* had appeared to be an almost diagramatic example of sibling species in which the most important Natural Selection factor guaranteeing their reproductive isolation was a basic physiological intolerance in each species of the foodplant of the other. Since we have found that no such intolerance exists, at least for *M. gryneus*, a number of additional aspects of the biology of these two species take on new interest. Some of the obvious questions to be answered may be stated as follows. 1) What is the fertility status of the F_1, F_2, F_3, and backcross hybrids between *M. hesseli* and *M. gryneus?* 2) Is *Juniperus* as suitable a laboratory foodplant for *M. hesseli* as *Chamæcyparis* is for *M. gryneus?* 3) In choice tests, both in the laboratory and in field observations without confinement, do ovipositing females of *M. hesseli* and *M. gryneus* choose one or the other foodplant oftenest when both trees are equally available? 4) And, more generally, does *M. hesseli* occur only with *Chamæcyparis* and, conversely, *M. gryneus* only with *Juniperus,* and if so, why?

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NOTES ON THE *PAPILIO MACHAON* COMPLEX IN ARIZONA

by David L. Bauer

The *Papilio machaon* complex is unusually well represented within the territory which comprises the State of Arizona. There has been considerable discussion as to the relationships and validity of some of the species, subspecies, and forms, which is understandable, since their ranges overlap in many places. The purpose of this paper is to help clear up some of these perplexing questions by a simple setting forth of the facts gathered from eight years of year-around collecting within the State.

My first acquaintance with this complex group in Arizona was at Yuma in the southwestern corner of the State. At Yuma *P. rudkini* Comstock is the most abundant *Papilio,* with form "clarki" running a close second. The form "comstocki" is not nearly as abundant as the other two forms. Within the town of Yuma the larvæ of *P. rudkini* fed on the introduced Queen Anne's Lace (*Daucus carota* L.), which grows in the flower gardens about town. Unfortunately no larvæ were found on native plants, but the finding of larvæ on an introduced Umbelliferæ indicates it may also feed on native plants of this family. However, *P. rudkini* larvæ have been found feeding on *Thamnosma montana* Torr. & Frem. (Rutaceæ) in the Ivanpah Mts. of southeastern California and in the Grand Canyon. This plant also grows in the Yuma area and is probably the native food plant about Yuma.

The range of *P. rudkini* is quite extensive. It is found along the Mexican border at Yuma and Sonoita and throughout the desert regions as far east as Phoenix and Wickenburg. To the north it skirts the higher plateau and mountain country, but extends into Utah and Nevada, running up the canyon of the Colorado River as far as the Grand Canyon National Park, also up the Verde River valley as far as Cottonwood.

The best places to look for *P. rudkini* are the desert dry washes and canyons of the desert mountains. The flight period is very irregular as is that of most desert butterflies; captures have been made from January through November. The deciding factor as to when it may be found seems to be rainfall. In one locality it may be absent for many months, while only ten or twenty miles away it may be in full flight, for rain in the desert is usually extremely local and unpredictable.

Much more needs to be learned about the relationship of *P. rudkini* to *P. polyxenes,* with which it comes in contact in the eastern part of its range.

Papilio polyxenes Fabricius is the second member of the group to be collected. Several specimens were picked up in the foothills of the Santa Catalina Mts. near Tucson, Arizona, and a number of larvæ were collected in a vegetable garden at St. David, Cochise Co., Arizona. These larvæ were feeding on Carrot leaves and in appearance were typical *P. polyxenes* larvæ.

P. polyxenes seems to be confined mostly to the southeastern part of the State. However, several specimens from the central part of Arizona appear to be *P. polyxenes.* One of these, a female, was collected on Mingus Mt., Yavapai Co., and two more females were reared from larvæ collected on Parsley (*Petroselinum crispum* Mill.) near Cottonwood. *P. polyxenes* seems to be even more variable in Arizona than in most of its range. Females vary from a very dark form with few, if any, of the yellow spots present to specimens similar to the one figured by BARNES and MCDUNNOUGH (*Contrib. Nat. Hist. Lepid. No. America,* vol. 3: plate IV, fig. 1). It is doubtful that such specimens should be placed under the name *P. americus* Kollar, for such specimens come from ova of typical females from which most of the adults are normal *P. polyxenes.* There have been reports of *P. polyxenes* from the Grand Canyon National Park, but careful examination of the specimens in the Work Shop collection at the Park revealed these specimens to belong to other species. So far, all records which have been checked place the range of *P. polyxenes* as the southeastern quarter of Arizona.

Papilio bairdii Edwards is the third member of the *P. machaon* complex found in the State. In the past it has been confused with form "clarki" of *P. rudkini* and with Arizona specimens of *P. polyxenes.* In eight years of collecting in the State *P. bairdii* proved to be a very scarce insect most years. About the only place where it may be found year after year is the Grand Canyon area, where it flies with *P. rudkini* and form "clarki" and "comstocki," and a large race of *P. indra.* This race of *P. indra* is very similar in appearance to females of *P. bairdii.* Consequently there has been considerable misidentification of specimens from the Grand Canyon area. Actually, *P. bairdii* is a very distinctive *Papilio* and need not be confused with either *P. polyxenes* or *P. rudkini* and can readily be separated from the *P. indra* race by the abdominal markings. EDWARDS' figures in his fine work are good representations of *P. bairdii* and are characteristic of Arizona specimens. His description is excellent and his characterization and statement of its variation are all true. It is given to great variation, and a single colony has yielded dark, light, intermediate, and all combinations of coloring and pattern from very dark melanic specimens, in which the postmedian band of yellow spots is all but obsolete, to form "hollandi" and specimens which cannot be separated from *P. brucei.* The one outstanding character which all the *P. bairdii* specimens examined possess is the large definitely yellow marginal and postmedian spots on the underside. Of course in melanic specimens the postmedian spots are reduced or obsolete. There is always a slight tinge of fulvous or orange in the postmedian yellow spots between the second and third median veins and the third median and first cubital veins on the under surface. From this minimum of two fulvous-tinged post-median spots, the amount of fulvous tinge may extend to all the post-median and marginal spots of the secondaries. However, in the most fulvous specimens fulvous remains just a tinge, and yellow remains the dominant color of the spots. Only one of the hundred or more specimens examined shows a barely perceptable fulvous tinge in the post-median spots of the primaries. There are a number of other characters that could be mentioned, each of which may or may not be present in a particular specimen. The markings of the abdomen vary without regard to the other characters. Very dark specimens may have heavily yellow-washed abdomens with black claspers, or light "hollandi" specimens may have dark abdomens; sometimes the abdomen is dark and the claspers completely yellow. The various characters seem to vary in color without relation to one another. In spite of all this variability *P. bairdii* can be separated readily from *P. rudkini* and *P. polyxenes* when one becomes familiar with its peculiarities. Female *P. bairdii* are usually very dark, with only a faint trace of the postmedian series of yellow spots. On the underside the characters are the same as for the male, with all light markings reduced and in some specimens an increase in the fulvous coloring.

P. bairdii occurs in a cycle of some kind, for it may be scarce or absent for a number of years, and then it suddenly becomes abundant. 1952 was a year of great abundance in central Arizona, particularly in the Mingus Mts. — Oak Creek Canyon area. The flight began in late spring (April and May), and the second generation was on the wing in late June. From late June until October and even the first part of November there followed a continuation of emergence. From July onward the ova, young larvæ, mature larvæ, chrysalids, and imagines could all be collected the same day. The last larvæ were collected in late October on Mingus Mt. Larvæ were also found in Oak Creek Canyon and at Fry Canyon near Flagstaff.

In early August, after numerous *P. bairdii* larvæ had been collected, a female of *P. polyxenes* came wandering through the garden and oviposited on the Parsley. This gave an excellent opportunity to rear the larvæ of the two species together and make careful comparisons. Below are the results:

Ova: those of *P. bairdii* are considerably larger than those of *P. polyxenes,* enough larger to enable easy identification with the naked eye; the color and shape are about the same.

First instar: *P. bairdii* are larger, with a greater amount of mid-dorsal light coloring.

Second instar: the proportionate difference in the size remains, but *P. bairdii* have a greater amount of whitish yellow dorsally.

Third instar: *P. bairdii* are one-third larger than *P. polyxenes;* the latter are still quite dark, with lighter mid-dorsal area; *P. bairdii* have the characteristic markings of the mature larva — yellowish green, striped with black on each segment, and with a series of orange spots on black bands.

Fourth instar: *P. polyxenes* are still dark, with a lighter mid-dorsal area; *P. bairdii* are larger and with definitely bright yellow-green color; not much change in markings.

Fifth instar: *P. bairdii* are varying shades of bright green, with narrow black bands and orange-yellow spots on the black bands and considerable black between segments. There are some *P. polyxenes* larvæ that remained very dark and predominantly black in color, while all *P. bairdii* larvæ were about the same bright green.

Pupæ: *P. bairdii* and *P. polyxenes* pupæ are quite different and may be distinguished readily. *P. bairdii* pupæ are considerably larger and thicker in shape, also less angular. The projection on the thorax is much smaller in *P. bairdii,* as are also the bifid head projections. These smaller projections, together with the stoutness of *P. bairdii* pupæ make them rather easy to separate from those of *P. polyxenes.* After emergence of the adults, it was interesting to note that the smaller *P. polyxenes* pupæ yielded considerably larger specimens for their size than did those of *P. bairdii.*

P. bairdii form "hollandi" Edwards: three specimens taken during the peak of the 1952 season have the wider band of post-median yellow spots which characterizes form "hollandi." These specimens are not true "hollandi" as pictured in HOLLAND'S *Butterfly Book* (pl. XL, fig. 3), in that they do not have the two yellow spots in the cell of the forewing. One specimen has a faint trace of these spots. One has one spot only, and the other has no trace of either of the spots. They also differ from HOLLAND'S figure in having yellow-spotted abdomens rather than the yellow sides of HOLLAND'S figure.

The same year that *P. bairdii* became so abundant four specimens of *P. bairdii brucei* were taken. These specimens were flying with the *P. bairdii* but are typical *P. brucei. P. brucei* has been much confused with *P. zelicaon,* but true *P. brucei* is very similar to *P. bairdii oregonia* Edwards, particularly on the underside of the primaries. However, it has heavier black markings on the underside of the secondaries. One character which seems to be constant and can be used to separate *P. brucei* and *P. zelicaon* is the color of the ventral surface of the abdomen. In all *P. brucei* specimens examined from California, Oregon, Arizona, and western Nebraska the ventral surface is predominantly yellow. In *P. zelicaon* from California, Oregon, Washington, Arizona, Utah, and Colorado the ventral surface is black. At present, this character seems to be the best to separate the two quite similar butterflies.

P. zelicaon Lucas has been taken along the northern border of Arizona, particularly on the Kaibab Plateau and eastward. These Kaibab specimens are true *P. zelicaon* and not *P. brucei* as they have been called by some. There seems, however, to be no reason why typical *P. brucei* should not be found flying with *P. zelicaon,* since *P. bairdii* flies in the area. Careful identification should be made of all *P. brucei* or *P. zelicaon* taken in northern Arizona.

Papilio indra Reakirt so far has been taken in Arizona only in the Grand Canyon and Kaibab Plateau area, where it flies with *P. bairdii, P. rudkini,* and *P. zelicaon.* The distinctive Arizona race of this species is being described and named in a separate paper.

The exact standing and relationships of the various species to one another in the area of the State of Arizona is not fully understood, for not all of the facts have been learned. At present it appears that *Papilio zelicaon* is a separate species; *Papilio bairdii,* with its "hollandi" and *brucei* forms is another species complex. The true relationship of *P. bairdii* and *P. brucei* is not certain, for *P. bairdii* is sexually dimorphic and *brucei* is not. This is also true of *P. rudkini* and its form (?) "clarki." It may be that these are separate but interbreeding species, instead of races or forms of one species. *Papilio polyxenes* is another species complex with an indefinite or little-understood relationship to the *Papilio rudkini* complex. For the present it would probably be best to retain them as separate speices. *Papilio indra* is a very fine species complex and at present appears to be one of the most distinct. The observations and experiments in crossing the various strains should shed much valuable information on the relations of these insects to one another.

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A NEW HOST PLANT RECORD FOR *STRYMON LIPAROPS*

by JOHN P. KNUDSEN

The early stages of *Strymon liparops* Bdv. & Lec. have been described in considerable detail, the account by SCUDDER (1889) being excellent in most respects. A wide variety of host plants are listed, including *Cratægus, Malus, Prunus, Vaccinium,* and, perhaps, *Ilex* and *Quercus.* These latter two are ABBOT'S records for *S. liparops liparops,* dating back to 1797. Others are listed, but these are sufficient to show that the species has a wide range of tastes when it comes to host plants.

However, a new and interesting addition to the list was discovered when on May 24, 1953, near Atlanta, Georgia, two larvæ were noted in a bouquet of wild Azalea (*Azalea calandulacea* Michx.). Both larvæ were in their final instar, and they fed for only four or five days before beginning the pupation process. It was in this feeding that the novel habits of the larva became apparent. Although the caterpillar is an intense shade of green it fed only upon the flame-colored flowers and buds of the Azalea. In these circumstances it is a conspicuous object contrasting brilliantly with the bright red or orange color of the flowers. It would seem that such behavior is courting disaster, but it appears to feed only on the flowers and never on the leaves. Feeding is done in stages. The larvæ eat rapidly for an hour or less and then retire to the under surface of a leaf where, well camouflaged, they presumably digest their meal before returning to the flower head to feed again.

Perhaps such behavior on the part of a *Strymon liparops* larva may have bearing on the question of whether or not *Kalmia* serves as a host plant for *Incisalia augustinus* Westwood. While I certainly have not seen *I. augustinus* feeding on Laurel it seems clearly possible that it might have a similar feeding habit, eating only the flowers, but resting among the leaves. ZIEGLER (1953) tentatively follows the suggestion of COOK in laying aside *Kalmia* as a host plant for *I. augustinus.* In view of what has just been learned about the feeding habits of *S. liparops* I suggest that *Kalmia* be retained on the list at least until further rearing studies can be made.

In his account of the early stages of *S. liparops,* SCUDDER (1889) notes that very little silk is spun. In this connection, we noted that in both of the instances observed here pupation took place on the foodplant in a loose "cocoon" formed by drawing together several leaves with a few well placed strands of silk. The pupation process appears to be a slow one in this species, heralded first by a change from the general green color to a brownish rose. It extends over a period of several days during which no feeding is done, the cocoon is constructed, and the final molt takes place. The pupæ are hairy and reddish brown with deeper brown blotches. In both observed cases, the duration of the pupal period was slightly more than two weeks, and emergence took place shortly after noon.

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A NOTE ON LEPIDOPTERA ON POSTAGE STAMPS

I was interested in the article "Philatelic Lepidoptera" in the *News,* since I am also a stamp collector/lepidopterist. To add to the stamps listed in this article as picturing Lepidoptera, French Equatorial Africa issued two series of Postage Due stamps, all values of which had the numeral of value superimposed on a butterfly. The 1937 set consisted of 11 values (5 centimes to 3 francs), and the 1947 set had 10 values (10 centimes to 20 francs).

The validity of the items listed in the article as being issued by the Republic of Maluku Selatan in the Moluccas as postage stamps has been questioned in the philatelic press, but still the items are colorful representations of six beautiful insects.

GEORGE R. WREN, 437 30th St. N.W., Canton 9, Ohio, U.S.A.

MORE PHILATELIC LEPIDOPTERA

Following the appearance of my article on philatelic Lepidoptera in the *Lepidopterists' News* (Vol. 8: 13-16; 1954), Dr. TEISO ESAKI of the Entomological Laboratory of Kyushu University, Fukuoka, Japan, kindly called my attention to several Lepidoptera on stamps which should be added to the list. Further additions by other readers would be very welcome. Here are Dr. Esaki's additions with his comments:

"Hawaii, 1890-1891, #52, 2 c. The hair ornament of the queen is a butterfly. [This therefore becomes the earliest stamp, to my knowledge, which depicts Lepidoptera, antedating by more than ten years the Dutch colony stamps mentioned in the original article.—M.E.S.]

"Japan, 1916, #154, 10 s. At the sides of the frame surrounding the Japanese denomination at the bottom are small stylized butterflies.

"Hungary, 1924, B 77, 300 k. A child looking at a flying butterfly. [I would consider this a dove, judging from illustrations, especially since the stamp is listed as depicting emblems of peace; however, I have not seen the original. — M.E.S.]

"Manchukuo, 1940, #136, 2 f. A *Papilio*-like butterfly is figured at the bottom.

"Korea recently [June, 1954 — M.E.S.] issued a stamp of 10 w., on which a noctuid moth and the Korean flag are depicted. This moth may be identified as *Metopta rectifasciata* Ménétriès, which has a curious round marking on the fore wings which is similar to the circular device of the Korean flag. It is said in Korea that the 'butterfly' appears on the occasion of national auspicious events. Actually, it is common throughout China, Korea, and Japan."

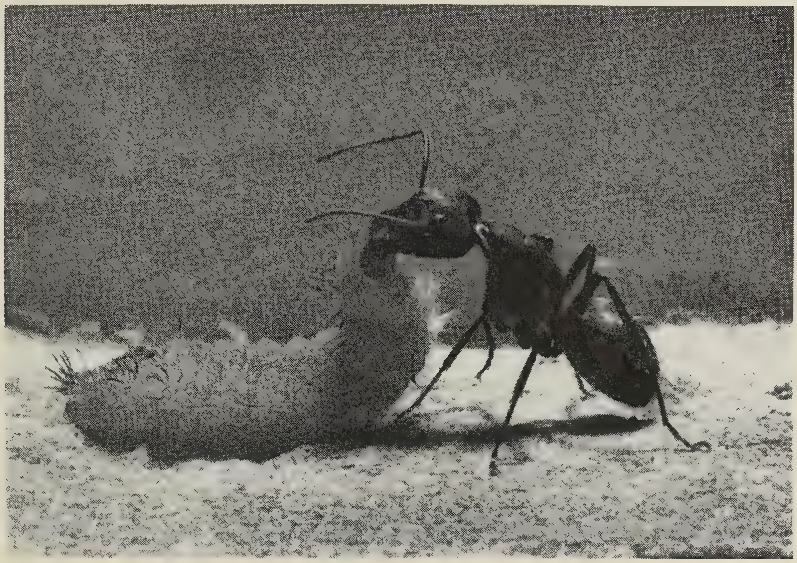
MARION E. SMITH, Dept. of Entomology, Univ. of Massachusetts, Amherst, Mass., U.S.A.

THE SIXTH ABERRANT FEEDER IN JAPAN —*SPINDASIS TAKANONIS* (LYCÆNIDÆ)

by TARÔ IWASE

On p.45 of the *Lepid. News* (vol. 7; 1953) after having enumerated five aberrant feeders among Japanese lycænid larvæ, I added that the sixth, if any, and probably the last, aberrant feeder might be *Spindasis takanonis* Mats., of which the younger stages had been only partially studied.

In May 1954, A. KAWAZOE discovered many mature larvæ and pupæ of *Spindasis* on and under the bark of the "red pines", *Pinus densiflora* Sieb. & Zucc., among the small brown "cocktailed" ants, *Crematogaster laboriosa* Smith. The larvæ are fed mouth to mouth by the ants, like Japanese *Niphanda fusca* Brem. & Grey (see figure) or African *Lachnocnema bibulus* Fab. I confirmed this dietary habit in a glass jar. The larva has a dorsal honey-gland or glands, and a pair of lateral retractile tubercles.



Larva of *Niphanda fusca* being fed by host ant by regurgitation. (Photo kindly provided by SAKAE TAMURA.)

Mr. KAWAZOE pointed out that the larvæ in a wild state nibbled some lichens and sphagna coating the trunks of the pines and even had a snack of a decayed cortex. He also induced the captive larvæ to imbibe a solution of honey. The pupæ were detected under the loose cocoon formed in cracks of the bark, attached by a cremaster, head downwards, without any cincture around the middle. When the colonies were disturbed, the ants were said to become so excited that they cut off the silken pad at the anal end of the pupæ, and carried them away or let them fall down on the ground.

In June the same year, quite independently of the above discovery, I. MORI and M. FUTO succeeded in finding the larvæ and pupæ of *Spindasis* lurking in the nests of the same "cocktailed" ants, under the bark and at the foot of *Pinus thunbergii* Parl. ("black pine"), *Prunus yedoensis* Mats. (cherry tree), and *Elæagnus umbellata* Thunb. (silverberry). Another kind of ant, *Camponotus herculeanus* ssp., the large black patron of *Niphanda*, destroyed a pupa of *Spindasis*, they stated.

Earlier, in July 1952, Mr. MORI observed females ovipositing on the sprigs of the "red pine" trees which the ants and their cows were frequenting. He bred the young larvæ that hatched in July by a solution of honey for a few days until they died. Since this insect is single-brooded it seems to hibernate as a halfgrown larva.

The life-histories of *Spindasis* spp. (the "Silverlines" in India; the "Barred Blues" in Africa) have been described by various authors such as DE NICÉVILLE, MOORE, GREEN, KERSHAW, TAKAHASHI, and JACKSON. They are unanimous in that the larvæ are associated with ants, mostly of genus *Crematogaster*. The larvæ are often found on the bark of the formicated boles. They sometimes live in the cells spun for themselves, but usually in the ant-runs or under the sheds made by the ants. Most of the writers depicted *Spindasis* larvæ as normally phytophagous:

S. *vulcanus* (India) on *Plectronia* (Rubiaceæ), *Zizyphus* (Rhamnaceæ), *Allophylus* (Sapindaceæ), *Clerodendron* (Verbenaceæ).

S. *lohita* (India, Ceylon, Hongkong) on *Terminalia* (Combretaceæ). *Psidium* (Myrtaceæ), *Xylia, Acacia* (Leguminosæ), *Grevillea* (Proteaceæ), *Convolvulus* (Convolvulaceæ), *Henslowia* (Santalaceæ), *Loranthus, Viscum* (Loranthaceæ), *Dioscorea* (Dioscoreaceæ).

S. *nyassæ* (Africa) on *Entada, Acacia* (Leguminosæ).

S. *natalensis* (Africa) on *Vigna, Mundulea* (Leguminosæ).

S. *mozambica* (Africa) on *Vigna* (Leguminosæ).

S. *ella* (Africa) on *Mundulea* (Leguminosæ).

The sole exception to this is JACKSON (1937), who alluded to the aberrant feeding habit of *Spindasis nyassæ* as follows: "The mouth-parts are small and I am inclined to think fitted best for absorbing a secretion and that although it is able in the early stages to feed on the shoots (of Acacia) and even does so with some advantage, it is not the main source of food supply."

The vegetation listed as the larval fare is extraordinarily promiscuous and includes many trailing, climbing, or parasitic plants. This appears to be a proof that some of them are not the real foodstuff, but mistaken as such by the observers, or at least the casual ones. The adult *Spindasis* may on most occasions select the host plants not as their larval foods, but as the habitats of the associated ants. The larvæ of this genus are not only attended by ants, but dependent on the latter. They are probably brought up by their nursing ants in many cases as in the case of the Japanese congener.

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FIELD NOTES

THE FOODPLANT OF *ERYNNIS PACUVIUS*

Although the foodplant and early stages of many of the *Erynnis* are known, such is not the case with *Erynnis pacuvius* Lintner, whose early life is still a mystery to entomologists.

While not overly common in Boulder County, Colorado, *E. pacuvius* is found in some numbers in a couple of general areas. It was while collecting in one of these areas, specifically the old Railroad Grade between Glacier Lake and Sunset on June 20, 1954, in company with LINCOLN and JANE BROWER, that I had my only opportunity to observe a female *E. pacuvius* about to oviposit. On a rather steep, open, grassy hillside I watched as a female hovered about and beneath the brambly branches of a shrub belonging to the New Jersey Teas. This was later identified for me by WILLIAM WEBER, Professor of Botany at the University of Colorado, as *Ceanothus fendleri* Gray.

Observing carefully the spots at which the female seemed to be ovipositing, I shortly discovered two single eggs attached to the twigs themselves. Gathering the branches containing these eggs I returned to the car. It was my intention to rear the species, but subsequent developments of this particular day made it such a hectic one that the eggs were lost in the shuffle. It is reasonable though, to believe that *Ceanothus fendleri* is the foodplant and not just an oviposition site, inasmuch as *E. pacuvius* seems to be limited to the areas where *Ceanothus* is plentiful.

I am in hopes that the coming summer will enable me to establish beyond doubt the fact that this is the true foodplant.

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FURTHER REMARKS ON THE HABITS OF *NYMPHALIS MILBERTI*

In a short note on the habits of *Nymphalis milberti* (*Lep. News* 4: 13; 1950) I described the manner in which these insects appear in the early spring after hibernation, much more commonly than during the summer. It seems to me that anything from the literature which sheds further light on this question would deserve mention in *The Lepidopterists' News*. We cannot all read all the available papers, and usually these things are come across only by accident.

I was recently privileged to read Dr. E. B. FORD'S fine book *Butterflies*. I have found there reference to several British butterflies which start hibernating in July, soon after emergence (p.103). One of the species mentioned is *Aglais urticæ*. From the excellent color photos in the book, I cannot make out any external difference between this butterfly and our *Nymphalis milberti*. I do not think that we should place too much importance on the difference in genus names. Often there is not very close cooperation between workers on opposite sides of the Atlantic. I have seen *N. milberti* referred to as *Aglais milberti*, though I have not been able to learn when or why the name was altered. There is another European species, *Nymphalis polychloros*, which seems, in the same way, to be the counterpart of our *N. californica* Bdv. HOLLAND writes of *N. californica* (he uses *Vanessa*) "It somewhat closely resembles the European *V. urticæ*". This seems to be the result of a muddle, not unusual I believe, with HOLLAND.

While on the subject I would like to add some more comments on my article referred to above. Since writing this I have increased my knowledge of the butterflies dealt with. I stated then that I had seen *N. milberti* before hibernation only in September. In recent years I have often seen them in July, but still only a fraction of the spring population. I am sure now that *N. milberti* specimens taken at 6000 ft. on Mt. Arrowsmith, in late July, are hibernated individuals which have only just been liberated by melting snow drifts.

I have also realized now that *Vanessa cardui* L. cannot "breed and thrive here once established", as I once supposed. Because spring migrants arrive very early, and may come on two successive years, to the casual observer the population appears to have wintered here. Dr. **Ford** states, a conclusion that I had begun to suspect for myself, that *V. cardui* cannot hibernate. Once a migration reaches a latitude where there is a definite winter, their offspring are doomed, unless perhaps they can return south, as *Danaus plexippus* is said to do.

Richard Guppy, Wellington, V.I., B.C., CANADA

A NOTE ON *LIMENITIS ASTYANAX* ON NANTUCKET

Most of my life till 1952 was spent on Nantucket, the outermost of the islands off southern New England. During that time and including several visits during the summer through 1945, I never saw a specimen of *Limenitis astyanax* Fab. nor any form of *L. arthemis* Drury on the Island. Yet Dr. **Frank M. Jones** found *L. astyanax* quite common on neighboring Marthas Vineyard as early as 1913, and during summer residence on Cape Cod the past eight years, I have found it present there, though because I have not spent much time on daylight collecting, I can say nothing about its relative abundance.

The latter part of August 1954 I spent three days on Nantucket and was surprised to see several specimens of *L. astyanax,* enough at any rate to conclude that the species has become definitely established sometime during the past ten years.

On the Vineyard, **Jones** found most specimens referable to the "astyanax" form, with occasional examples of "albofasciata", "proserpina", "atlantis", and "viridis". In Barnstable, limited collecting has turned up only "astyanax" and "viridis". On Nantucket, the few specimens seen sufficiently closely for a long enough look seemed to be mostly "viridis", possibly the "astyanax" form, but certainly with no suggestion of white.

It seems rather surprising that it has taken so many years for *L. astyanax* to find its way to Nantucket. Possibly it has been there in the past, but if so, there should be no reason why it should have disappeared, as the supply of acceptable foodplants is ample. Weather conditions are not appreciably different on Nantucket from those on the Vineyard or Cape; in fact the winters are a very few degrees milder. Perhaps the water barrier has intervened.

The water barrier between the Cape and Nantucket at its least is about ten miles, though effectively it is more like twenty-five because there are long, sandy points reaching out like fingers from either shore, both unsuitable for the support of *L. astyanax.* From the Vineyard to Nantucket, open water is only six miles, but again the gap is effectively much greater because the nearest section of the Vineyard is sandy and rather barren, and the small, stepping-stone islands west of Nantucket offer almost no foodplant to provide for a gradual eastward migration. Consequently it might mean a matter of fifteen miles between adequate feeding grounds. Whether this is a serious hindrance in establishing a colony, I leave to the more ardent students of the subject.

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MINUTES OF FIFTH ANNUAL MEETINGS OF THE LEPIDOPTERISTS' SOCIETY

The meetings were held at the Carnegie Museum, Pittsburgh, Pennsylvania, December 28-30, 1954. Tuesday morning, Dec. 28, was given to registration and a tour of the collection. On Tuesday afternoon HARRY K. CLENCH introduced Dr. M. GRAHAM NETTING, Director of the Museum, who gave a welcome to the members of the Society. The Presidential Address was delivered in person by Dr. A. DIAKONOFF. Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands, and was titled "General Aspects of Microlepidopterology". One feature of his paper was a description of a remarkable viviparous species which seems to be parthenogenetic. He ended his paper with his creed of taxonomy. The afternoon session ended with the annual Business Meeting. P. S. REMINGTON was appointed Secretary *pro tem.,* in the absence of Dr. RINDGE. The Report of the Treasurer, SIDNEY A. HESSEL, was read by C. L. REMINGTON and will be published in the *News.* The report showed that there is still an accrued deficit of about $700 which it is expected that the increase of dues will erase. Dr. REMINGTON told of plans to publish separate memoirs in the near future and of plans to include in future issues of the *News* a section specifically for amateurs under the editorship of Prof. JAMES MERRITT. The following resolutions were adopted by the twenty members present: (1) Resolved that, inasmuch as the Carnegie Museum has graciously extended to The Lepidopterists' Society the use of its excellent facilities for its meetings, be it voted that the Society send its deep thanks to Director M. GRAHAM NETTING and his staff in the cafeteria and elsewhere. (2) Resolved that it be voted that the Society extend its warm thanks to HARRY K. CLENCH, JOHN BAUER, WAYNE DIXON, and Mr. and Mrs. CHARLES G. MERKEL, and especially Dr. GEORGE E. WALLACE for their successful efforts in preparation for the meeting.

Dr. DIAKONOFF mentioned the possibility of printing the *News* and *Memoirs* in Europe, where the cost is less. LLOYD M. MARTIN of the Los Angeles County Museum gave a report of the new West Coast section which was established this year and met at Berkeley, California, over Labor Day; the meeting was well attended, and the plan is that the meetings of this section of the Society will be an annual affair.

There was an extended business discussion by the members present. The Treasurer has reported that the number of members in the Society has been static for about three years. He proposes that a membership committee be formed to work on plans for increasing the membership. We are all urged to encourage anyone interested in Lepidoptera to join the Society.

Tuesday evening was given to the annual social Smoker, in the Museum dining room. An anonymous friend of the Society had provided an abundance of refreshments, liquid and solid, and the members enjoyed a full evening of congenial conversation.

The Wednesday morning session, with Mr. CLENCH presiding, included the following papers and a discussion of each:

1. "Hybridization Studies in the Genus *Hyalophora* (*Platysamia*)".
   T. N. FREEMAN, Systematic Entomology, Science Service, Ottawa, Canada.
2. "Hybridization Studies of Species Relationships in the Genus *Papilio*".
   C. L. REMINGTON, Yale University, New Haven, Connecticut (with a demonstration of *P. polyxenes* × *P. machaon* hybrids and a set loaned by Dr. C. A. CLARKE of hybrids of *P. glaucus* × *P. rutulus*).
3. "*Agraulis vanillæ* in Mississippi".
   BRYANT MATHER, Jackson, Mississippi (read by Mr. CLENCH).
4. "Notes on Methods of Collecting Indo-Australian Lepidoptera".
   R. STRAATMAN, The Hague, Netherlands (read by Dr. DIAKONOFF).
5. "On Variation in *Epargyreus clarus*".
   B. W. DIXON, Pittsburgh, Pennsylvania.
6. "Microslides for Genitalic Preparations".
   A. DIAKONOFF, Rijksmuseum van Natuurlijke Historie, Netherlands.

The program of the afternoon session, with Dr. DIAKONOFF presiding, was as follows, again each paper being followed by extended comment:

7. "Some Observations on the Hesperiidæ of the St. Louis Area".
   P. S. REMINGTON, St. Louis, Missouri.
8. "The Northern Insect Survey and Notes on Arctic *Colias*".
   T. N. FREEMAN, Systematic Entomology, Science Service, Ottawa, Canada.
9. "The Sphingidæ of Jamaica and Related Forms of the Antilles".
   MARGARET M. CARY, Philadelphia, Pennsylvania.
10. "Remarks on the Zoogeography of *Cocytia*".
   HARRY K. CLENCH, Carnegie Museum, Pittsburgh, Pennsylvania.
11. "Foodplant Specificity in Sibling Species, Especially in *Mitoura gryneus*".
   C. L. REMINGTON and ROGER W. PEASE, JR., Yale University, New Haven, Connecticut.
12. "A Suggested Program for Attracting Young People to the Study of Lepidoptera.
   C. W. STAFFORD, Pittsburgh, Pennsylvania.
13. "Method of Making Plastic Mounts for Lepidoptera."
   OTTO ACKERMANN, Irwin, Pennsylvania.

The Lepidopterists' Banquet was held Wednesday evening in the Museum dining hall, followed by a beautifully illustrated talk by LLOYD M. MARTIN of the Los Angeles County Museum on Lepidoptera collecting in the Southwest. Dr. REMINGTON then showed a few Kodachrome slides, particularly of Lepidoptera eggs. The meeting resumed the friendly conversations begun at the Smoker.

Thursday was allotted to informal visiting and study among the great collections of Lepidoptera in the Museum.

The following members from 3 nations and 5 U.S.A. states attended the Pittsburgh meetings: RICHARD ACETTA, OTTO ACKERMANN, R. A. ANDERSON, JOHN BAUER, MARGARET M. CARY, H. K. CLENCH, A. DIAKONOFF, B. W. DIXON, GEORGE EHLE, T. N. FREEMAN, J. A. MALCOLM, JR., WILLIAM MALCOLM, ARNOLD MALLIS, L. M. MARTIN, W. B. MERGOTT, Mr. and Mrs. C. G. MERKER, F. W. PRESTON, JUNE D. PRESTON, C. L. REMINGTON, P. S. REMINGTON, L. J. SANFORD, C. W. STAFFORD, G. E. WALLACE.

Respectfully submitted,
P. SHELDON REMINGTON
Secretary *pro tem.*

MINUTES OF THE FIRST PACIFIC SLOPE MEETINGS OF THE LEPIDOPTERISTS' SOCIETY

The meetings were held Saturday, Sept. 4, and Monday, Sept. 6, 1954 (Labor Day), at the California Academy of Sciences, San Francisco, Calif., U.S.A. Through arrangements kindly made by HUGH B. LEECH of the Academy, a large, very adequate auditorium in Simpson African Hall was available for the meetings both days.

On Sept. 4, the time from 9:00 a.m. to 10:15 a.m. was spent in registration of members and guests. The first order of business was the unanimous election of LLOYD M. MARTIN to preside over the meetings. It was decided a secretary was needed, and ROBERT L. LANGSTON was elected. With the officers for the meetings selected, Mr. MARTIN informally welcomed the members and introduced the first speaker. HUGH B. LEECH, Curator of Aquatic Coleoptera, California Academy of Sciences, gave the formal welcome. The Presidential Address and a paper on New Guinea Insect Fauna by President A. DIAKONOFF of the Netherlands were read by FRED T. THORNE. The paper included biology and coloring and revealed that black and white predominated in most insect orders on New Guinea.

"The California Academy of Sciences and Its Insect Collections" were discussed by Mr. LEECH. He gave a brief history of the Academy in San Francisco since its inception. At 11:30 a.m. WILLIAM HOVANITZ gave a talk entitled "Studies in the Genus *Colias*." It was supplemented with colored slides of the various species concerned and their intermediates in interbreeding populations. Numerous maps of their distribution were also shown. An invitation was extended by Dr. HOVANITZ to meet informally in the evening at his home in Oakland.

At 2 p.m., following a congenial luncheon, Mr. THORNE read in the absence of TARÔ IWASE of Japan, his paper entitled "Japanese Butterfly Fauna Compared with that of California." At 2:30 p.m. J. W. TILDEN took the floor to read another paper *in absentia.* He at first asked the group to express their opinion on the number and types of papers to be submitted in the future, and then read "Collecting on Vancouver Island" by RICHARD GUPPY. As certain points were brought out in the paper, the meeting turned informally to a lively discussion of some very local insects — *Plebeius pheres* and *Glaucopsyche xerces* and their association with sand dunes, lupine, ants, etc. At 3:00 p.m. W. H. LANGE of the University of California at Davis spoke on "Aquatic Pyralidæ of Western North America." He had on display an aquarium with larvæ and pupæ of two species of Nymphulinæ, one on rocks, the other on water plants. Slides of the insects also accompanied the talk.

At 4:00 p.m. Mr. MARTIN adjourned the meeting to the Entomology Department of the Museum. Mr. LEECH had various items on display for the lepidopterists, including the Dog-face Butterfly (*Zerene*) collection of Mrs. RIDDELL and the specimens figured in Wright's *Butterflies of the West Coast.* The Academy's collection was also available for inspection by the members. However, time was at a minimum as a full evening had also been planned. Upon leaving, a group picture was taken by THOMAS W. DAVIES.

Members and guests met for dinner at Alioto's on Fishermans Wharf. The majority then went across the bay to Oakland and the new home of Dr. and Mrs. HOVANITZ. In addition to informal discussions and refreshments, the main event was the showing of colored slides by the host. Dr. HOVANITZ narrated with the pictures of many collecting areas for his studies on *Colias.* Many *Colias* species are circumpolar in distribution, and the slides illustrated much of the inaccessible country in Alaska, Northern Canada, and Greenland — areas above timberline, tundra, at glacier's edge, in fact wherever their foodplants may get a foothold. Another series was shown for the *Colias* taken in Northern Europe and the Alps.

An interest had been shown among those in attendance for a group collecting trip. It was decided that on Sunday, Sept. 5, those interested would meet at Antioch (Contra Costa County) for the express purpose of collecting *Apodemia mormo langei.* Lange's Metal-mark was taken in fair numbers by everyone, but also as an unexpected bonus, about a dozen *Ochlodes yuma* were collected by the group. Other Lepidoptera were present, the most common being *Danaus plexippus, Brephidium exilis, Erynnis tristis, Hylephila phylæus, Ochlodes sylvanoides,* and *Lerodea eufala.*

The meetings of Monday, Sept. 6, were called to order by Mr. MARTIN at 9:45 a.m. DONALD PATTERSON was elected chairman of the day. Dr. TILDEN read in the absence of GERHARD HESSELBARTH of Germany his paper, "A Rearing Cage for Lepidoptera." A cage of plywood top and bottom with nylon netting for sides, collapsible for field use, was circulated among the group. The paper told of various modifications for this and other cages depending upon the use for which intended. Several letters were read from people who were unable to attend, including E. M. KINCH, CHARLES HILL, H. A. FREEMAN, and F. MARTIN BROWN. At 10:15 a.m. a paper entitled "*Cœnonympha* of the West Coast of the United States" by WILLIAM N. BURDICK was read by Dr. LANGE. The paper caused a lively discussion pertaining to synonomy, geographical and seasonal races. C. DON MACNEILL, University of California, Berkeley, spoke on "Speculations Concerning Territoriality in the Hesperiidæ" — the phenomenon of the adult males establishing a definite or indefinite area, patrolling it, and investigating all intruders. It developed into a rather long informal discussion on antagonism, limits of territories, and egg fertility in relation to the flight period of the male. "The Breeding of Theclini (*Zephyrus*) — How can their Eggs be Collected in Winter?" by TAKESHI KUZUYA of Japan was read in his absence by Mr. LANGSTON. The paper described collecting methods not often used in the U. S. A., and their advantages for certain breeding purposes. With very little discussion, the meetings were adjourned at 12:30 for lunch.

The afternoon session was called to order by Mr. PATTERSON at 2:00 p.m. JOHN HARVILLE of San Jose State College gave a very interesting and informative talk on "Population Dynamics in the California Oak Moth." *Phryganidia californica* becomes a serious economic pest every fourth or fifth year. It is kept under control in other seasons by an interacting complex of environment, parasites, predators and disease. One point he stressed is the extreme local nature of the moth — an oak tree will be completely defoliated, whereas one fifty feet away may almost escape infestation. The talk was accompanied by a display of the life stages of the moth and the parasite - predator complex. At 2:45 p.m. Mr. MACNEILL read J. P. KNUDSEN'S paper "Interspecific Hybrids in *Papilio machaon*." illustrated with slides. JOHN C. DOWNEY of the University of California, Davis, then took the floor for a treatise on "Subspeciation in Western *Plebeius icarioides*." On display were photographs, a map of the distribution of the "races" concerned, and wings mounted on permanent microscope slides for critical examination of venation, scales, and wing pattern. As no constant genitalic differences were found within the *Plebeius icarioides* complex, considerable discussion followed, *pro* and *con*, as to whether coloring and wing pattern can be used as taxonomic characters.

The business meeting was convened at 4:15 p.m. Mr. PATTERSON opened a discussion of the meetings for 1955. It was moved that the meetings be held near a large population center (preferably southern California) to insure adequate attendance. With opinions split between Los Angeles and San Diego, it was brought up to a vote. The majority decided that the Second Pacific Slope Meetings of the Lepidopterists' Society will be held in San Diego, California, on Labor Day weekend, 1955.

It was moved, seconded, and passed that the California Academy of Sciences be thanked formally by the Society for its wonderful hospitality, with letters of thanks to Dr. ROBERT C. MILLER, Director of the Academy, and to Mr. H. B. LEECH of the Entomology Department.

It was recommended that Mr. LANGSTON, as Secretary, send letters to the authors of papers submitted *in absentia*, thanking them for their splendid cooperation in the program, even though not present.

Before adjournment Dr. TILDEN requested those present to list the *Ochlodes yuma* taken at Antioch the previous day and any other records of this species.

It was moved, seconded, and passed that a Program Committee be elected for the 1955 Pacific Slope Meetings. Dr. HOVANITZ was nominated and unanimously elected as Program Chairman, with powers to appoint his assistants.

With no more old or new business, the meeting was adjourned at 4:45 p.m.

A total of $9.50 was received in registration fees. This sum was turned over to Mr. THORNE, which almost exactly covered the costs of envelopes, postage, and the mimeographed programs.

The following members and guests registered for the meetings:
D. L. BABER, L. P. COY, R. D. CUYLER, T. W. DAVIES, J. C. DOWNEY, W. A. HAMMER, J. HARVILLE, W. HOVANITZ, W. H. LANGE, R. L. LANGSTON, D. D. LINSDALE, C. D. MACNIELL, L. M. MARTIN, P. A. OPLER, D. PATTERSON, W. PATTERSON, J. A. POWELL, F. T. THORNE, J. W. TILDEN, R. N. WITTMAN.

Respectfully submitted,
ROBERT L. LANGSTON,
Secretary *pro tem.*

REVIEW

COLORADO BUTTERFLIES. PART I. SATYRIDÆ. By F. Martin Brown, assisted by Donald Eff and Bernard Rotger. *Proc. Denver Museum Nat. Hist.*, no. 3: 32 pp., 23 figs. 30 Sept. 1954. [Price $0.50; available from Curator of Publications, Denver Museum of Natural History, City Park, Denver, Colo., U.S.A.]

At last a careful, authoritative, and well illustrated treatment of the butterflies of Colorado is being published. Colorado is one of the favorite states for travelling collectors, for good reasons, but no adequate work on the butterflies has existed. The section on the Satyridæ is the first of five. It includes 21 species, which may be the largest number of Satyridæ for any one state or province in North America. There are 7 species of *Œneis,* alone, and 4 of *Erebia,* as is appropriate for the state with the largest area of high mountains.

The author gives two aims for *Colorado Butterflies* (p. 3): "First, to present for the first time a fully illustrated account of the butterflies found in Colorado for the beginning collector; second, to record for the more serious students something about the geography of the various species as they are found in Colorado." While both aims have been substantially fulfilled, it is a reviewer's duty to point out several more or less minor difficulties in the first part, which it may prove desirable to consider in later parts. Every species is illustrated by a photograph of the upper and undersides, and while the reproduction is less perfect than might have been hoped, these figures are fine for identifying all but the most confusing species. They all have one very serious omission in the total lack of explanatory captions. It is of great importance that the sex and precise locality of capture be stated for every specimen figured. If possible, this information should be given for the Satyridæ part, perhaps as an *addendum* in one of the later parts. Even beginners might be misled into mistaking sexual differences for species differences. More serious lepidopterists will need to know whether the *Lethe eurydice* and *Cœnonympha haydeni* figured are Colorado specimens, what part of Colorado the *Cœnonympha tullia* and *Cercyonis pegala* races are from, what the four photographs of *Erebia theano* show, which subspecies of *Œneis uhleri* is shown, and so on.

It is a surprise to find how little the life histories of Colorado butterflies have been studied since the time of W. H. Edwards, before the turn of the Century. Among the few new observations is one on *Œneis alberta oslari* in which it is not clear whether the species is known to feed on *Festuca* naturally, or only in confinement.

There is no guide to the meaning of collectors' or institutions' initials, and some of these initials cannot be understood by reading the text.

Aside from the absence of figure captions, these are minor points. *Colorado Butterflies* will be of great value to all of us working with the Rocky Mountains fauna and an important item for the bookshelf of lepidopterists in North America and elsewhere. Messrs. Brown, Eff, and Rotger have had more experience with Colorado butterflies than any other collector of this century. The appearance of the remaining parts will be eagerly expected. Mr. Brown has just noted that Part II, on the Danaidæ, Heliconiidæ, and Nymphalidæ, is expected to be issued in March. Part III, on the Libytheidæ, Riodinidæ, and Lycænidæ, is due in September. Some colored plates are expected with the index and *addenda.* All parts will have the same format and price, and they are paged consecutively so that they can be bound as a single volume.

C. L. Remington, Osborn Zool. Lab., Yale University, New Haven 11, Conn., U.S.A.

RAY ROMINE

On August 24, 1954, RAY ROMINE of Caledonia, Ohio, passed away at the age of 44 after an illness of slightly more than 4 months. Born February 15, 1910, in Hartford City, Indiana, RAY had been an avid collector since 1931, when he became interested in butterflies and moths as the result of some work on a Boy Scout Merit Badge.

Anyone who knew him personally could only wonder what most people do with their time, for here was a man of many and varied interests who squeezed every drop of doing from every living minute. For a livelihood he was a mail carrier, but the remainder of the time he was a devotee of many hobbies, with only a portion of the time he would have liked to devote to them. In addition to the Lepidoptera, there were poetry, raising and hybridizing of fancy iris, greenhouse gardening, stamp collecting, painting and cartooning, plus an inherent love of all nature. Since 1942 he has written more than 3000 verses, of which nearly 300 have already been published in some of the leading magazines. Two have appeared in the *Saturday Evening Post* since his demise. His keen sense of observation and wit appears to best advantage in his verses. His iris gardens are well-known and a mecca for visitors during flowering season.

Although he probably crammed as much living into his 44 years as most people do in 60, his biggest disappointment undoubtedly would be the fact that he didn't live long enough to realize the pleasure he would have had from the fulfillment of one of his wishes, that of a dream home in 18 acres of wooded land on the very banks of the Olentangy River. He is survived by his wife TRELLA and one daughter, SANDRA. For the present his collection will remain in the custody of Mrs. ROMINE.

DONALD EFF, 820 Grant Street, Boulder, Colo., U.S.A.

CECIL JOSLYN BROOKS died at Hampstead, England, on 17 March 1953, at the age of nearly 78 years. He was a noted resident collector of Bornean and Sumatran Lepidoptera and in later years became an authority on Amathusiidæ. His collections are in the British Museum, and the Castle Museum, Norwice. (For fuller obituary, see Gabriel, *Entomologist* 88: p. 23; 1955.)

C. L. REMINGTON

Any reader of the *News* who would find useful one or more copies of Mr. S. A. HESSEL'S "Guide to collecting the plant-boring larvæ of the genus *Papaipema* (Noctuidæ)" (*Lepid. News* 8: pp. 57-63) should write him at: Nettleton Hollow, Washington, Conn., U.S.A. Loose copies can be used in the field and for making hand-notes on these superb moths. The collecting season for larvæ begins in July. A self-addressed, stamped envelope will be appreciated, from U.S.A. members.

Additional records for the checklist of the Lepidoptera of Florida should be sent to C. P. KIMBALL, Route 4, Box 942, Sarasota, Fla., before the end of the summer; the deadline has been extended. Questionnaire forms are available from Mr. KIMBALL. Every Florida record, especially of moths, should be contributed for this important work.

C. L. REMINGTON

RECENT LITERATURE ON LEPIDOPTERA

Under this heading are listed publications on Lepidoptera from all scientific periodicals available to our cooperating abstractors. It is intended that every paper and book related to Lepidoptera and published in any part of the world after 1946 will be included. ***Abstracts give all new species, subspecies, genera, and higher categories, with type localities and generotypes, but varieties, aberrations, etc. are omited.*** Papers from *The Lepidopterists' News* are listed but not abstracted. Initials of cooperating abstractors are as follows: [P.B] — P. F. BELLINGER; [A.D.] — A. DIAKONOFF; [W.H.] — WALTER HACKMAN; [N.O.] — NICHOLAS OBRAZTSOV; [C.R.] — C. L. REMINGTON; [J.T.] — J. W. TILDEN; [P.V.] — PIERRE E. L. VIETTE.

B. SYSTEMATICS AND NOMENCLATURE

Amsel, H. G., "Ueber einige von Ragonot und Dumont beschriebene palæarktische Microlepidopteren des Pariser Museums" [in German]. *Rev. franç. Ent.*, vol. 20: pp. 223-230, 11 figs. 1953. Descriptions and figures of ♂ genitalia of *Cephis chretienellus, Pempelia fraternella, Brephia tortilisella, Salebria venustella, S. fasciculatella, S.* (*Laodamia*) *tahlaella, Capparidia ghardaialis, Eulia pierre-lovyana.* Discussion of every species is given and a new genus is described: *ASALEBRIA* (type *S. venustella* Rag.). [P.V.]

Aubert, Jacques F., "Revision des types et de la collection F. de Rougemont" [in French]. *Rev. franç. Lépid.* vol. 14: pp. 108-115, 2 pls., 3 figs. 1954. Revision and study of the types and the collection of F. DE ROUGEMONT, author of a collection of the Lepidoptera from the Swiss Jura. [P.V.]

Aubert, J. F., & Ch. Boursin, "Les Phalénides (Noctuelles) du Jura (Revision de la nomenclature et introduction à la faune des Macrolépidoptères du Jura)" [in French]. *Bull. Mens. Soc. Linn. Lyon,* vol. 22: pp. 115-126. 1953. A very useful list, with the up to date nomenclature, of the Phalænidæ (Noctuidæ) of the Jura mountains. This list is, in part, the result of the studies of M. CH. BOURSIN and is very important but unfortunately incomplete. [P.V.]

Berger, L. A., "Descriptions préliminaires de *Mylothris* nouveaux du Musée royal du Congo belge (Lepidoptera Pieridæ)" [in French]. *Rev. Zool. Bot. Afric.,* vol 46: pp. 319-322. 1952. Describes as new *M. schoutedeni, M. sjöstedti hecqui* (with also a new form), *M. nubila fontainei,* and a new form of *M. yulei ertli,* all from Belgian Congo. [P.V.]

Berger, L. A., "Sur la validité du genre *Cymothoë* Hübner 1819 (Lep. Nymphalidæ)" [in French]. *Lambillionea,* vol. 52: pp. 65-67. "1952" [1953]. Shows that *Cymothoe* Rafinesque is a *lapsus calami* and that *Cymothoë* Hübner is not preoccupied. [P.V.]

Berger, L. A., "*Aphnæus* nouveaux du Congo Belge (Lep. Lycænidæ)" [in French]. *Lambillionea,* vol. 52: pp. 68-70. "1952" 1953. Describes as new *Aphnæus affinis* subsp. *seydeli* (Elizabethville, Belgian Congo) and two new forms of *A. orcas.* [P.V.]

Bernardi, G., C. Herbulot, & J. Picard, "Liste des Grypocères et Rhopalocères de la faune française conforme aux Règles Internationales de la Nomenclature" [in French]. *Rev. franç. Lépid.,* vol. 11: pp. 377-384, 420-431; vol. 12: pp. 329-334. "Oct/Nov. [16 Dec.] 1948; "Dec. 1948" [10 Feb. 1949]; "Nov./Dec. 1950" [8 may 1951]. These parts cover all diurnals except Satyridæ and Libytheidæ. All valid genera, subgenera, and species are listed, with synonyms; there are notes on nomenclature and a brief bibliography for each family. [P.B.]

Błeszynski, Stanisław, "Materialien zur Kenntnis der Gattung *Crambus* F.: Teil IV. Ein neuer europäischer *Crambus* aus der Gruppe '*geniculeus* Haw.' " [in German]. *Zeits. Wiener Ent. Ges.,* vol. 37: pp. 148-151, 1 pl. 15 Dec. 1952. Describes as new *C. tolli* (Ragusa, Dalmatia) and discusses relationships in this group; figures adults and ♂ genitalia. [P.B.]

Bourgogne, Jean, "Un ouvrage intéressant les lépidoptéristes. Le *Traité de Zoologie* de P.-P. Grassé [in French]. *Rev. franç. Lépid.,* vol. 13: pp. 253-255. "May/June/Sept." [15 Nov.] 1952. Summarizes author's classification of Lepidoptera, as given in the work reviewed. [P.B.]

Bourgogne, J., "Nouvelle description d'*Oreopsyche colossa* A. Bang-Haas, bona species et description d'une forme inédite de cette espèce" [in French]. *Rev. franç. Ent.*, vol. 21: pp. 65-71, 13 figs. 1954. New description of *O. colossa* (Psychidæ), considered as valid species, with the description of a new subspecies *melanura* from Portugal. [P.V.]

Bourgogne, J., & H. de Lesse, "Un rhopalocère de plus à inscrire au Catalogue des Lépidoptères de France: *Euphydryas ichnea* Bdv. (=intermedia Mén.) (Nymphalidæ)" [in French]. *Rev. franç. Lépid.*, vol. 13: pp. 143-152, 1 pl., 1 map. "Nov./Dec. 1951" [28 March 1952]. Redescribes species; discusses range, biology, and systematic position. [P.B.]

Boursin, Charles, "Zwei neue *Agrochola* Hb.-Arten (*Orthosia* auct.) aus der Umgebung von Ochrid in Mazedonien. Beiträge zur Kenntnis der 'Agrotidæ-Trifinæ' LVI" [in German]. *Zeits. Wiener Ent. Ges.*, vol. 38: pp. 62-66, 1 pl. 1 April 1953. Describes as new from Macedonia *A. wolfschlägeri, A. thurneri,* and a "form" of the latter; figures ♂ genitalia of these and of 3 other spp. (including *A. pauli,* a valid species). [P.B.]

Boursin, Charles, "Über die systematische Stellung von *'Hiptelia' apfelbecki* Rbl. nebst Beschreibung einer neuen Gattung. (Beiträge zur Kenntnis der 'Agrotidæ-Trifinæ' LVII)" [in German]. *Zeits. Wiener Ent. Ges.*, vol. 38: pp. 68-70, 1 pl. 1 April 1953. Describes as new *PSEUDOXESTIA* (Zenobiinæ) for *"H." apfelbecki.* Discusses status of *Hiptelia* (synonym of *Amathes*) and *Xestia* (monotypic, in Heliothidinæ) and of species formerly assigned to them. Figures ♂ genitalia of *P. apfelbecki.* 2 related Zenobiinæ, and 3 other *"Hiptelia"*. [P.B.]

Clarke, J. F. Gates, "The moths of the genus *Coptotelia* Zeller (Lepidoptera: Œcophoridæ)" [in English, Spanish summary]. *Acta Zool. Lilloana,* vol. 11: pp. 335-352, 5 pls. 13 Dec. 1951. Describes as new *C. allardi* (Tingo María, Peru); *C. complicata* (Sta. Catharina, Brazil); *C. pecten* (Volcán, Sta. María, Guatemala); *C. cyathopsoides* (Zamora, Ecuador); *C. perseaphaga* (San Pedro de Montes de Oca, Costa Rica; on avocado leaves); *C. gioia* (Incachaca, Cochabamba, Bolivia); *C. terminalis* (Teapa, Tabasco, Mexico); *C. elena* (São Paulo de Olivenca, Amazones, Brazil). Removes *Coptotelia* from synonymy under *Hypercallia.* Figures adults and genitalia of all spp. (including the nine previously described). [P.B.]

Descimon, H., & H. de Lesse, "Découverte d'un nouvel *Erebia* dans les Hautes-Pyrénées" [in French]. *Rev. franç. Lépid.*, vol. 14: pp. 119-122, 1 pl. 1954. Description of a new species of *Erebia, E. serotina* (Cauterets, Pyrenees Mts.), a species in the *epiphron* group. Location of the holotype not given. [P.V.]

Dufrane, A., "Saturniidæ d'Afrique" [in French]. *Bull. Mens. Soc. Linn. Lyon,* vol. 22: pp. 234-248. 1953 List of species collected in French Ivory Coast, Portuguese Angola, and Belgian Congo. *Eustera pohli* (Belgian Congo) and *Tagoropsis genoviefæ centralis* (Belgian Congo) described as new, also new "forms" of *Epiphora albida. E. ploetzi, Pselaphelia gemmifera, Pseudantheræa discrepans,* and *Decachorda rosea.* [P.V.]

Dumbleton, L. J., "A new genus of seed-infesting micropterygid moths." *Pacific Sci.*, vol. 6: pp. 17-29, 11 figs. Jan. 1952. Describes as new *AGATHIPHAGA* [type *A. vitiensis* nov. (Fiji)], and *A. queenslandensis* (Como, and Maryborough, Queensland). These extraordinary insects, somewhat intermediate between the Micropterygidæ and Eriocraniidæ, are internal feeders, as larvæ, in seeds of the Kauri Pine, *Agathis.* All stages are described and figured in great detail, and an unknown hymenopterous parasite larva is recorded. [P.B.]

Evans, W. H., *A catalogue of the American Hesperiidæ including the classification and nomenclature adopted in the British Museum (Natural History). Part I. Introduction and Group A — Pyrrhopyginæ.* 92 pp., 9 pls. London: British Museum, 1951. The work is in the form of running keys, one to the "sections" and genera of Pyrrhopyginæ, and succeeding ones to the species and subspecies of each genus. Describes as new: *Pyrrhopyge phidias rusca* (Huambo, Peru), *P. aziza lexos* (British Guiana), *P. a. troja* (San Ramon, Peru), *P. a. arbor* (Venezuela), *P. pusca* (Chanchamayo, Peru), *P. proculus cintra* (Vila Nova Amazonas, Brazil), *P. infantilis agala* (San Jacintho, Bolivia), *P. thericles ponicia* (Cayenne, French Guiana), *P. t. fola* (Bogotá, Colombia), *P. amythaon gradens* (Pará, Brazil), *P. a. polka* (French Guiana), *P. a. perula* (La Merced, Peru), *P. a. orino* (Maipures, Orinoco), *P. a. pollio* (Chaquimayo, Peru), *P. a. podina* (Bolivia), *P. sergius selina* (Pará, Brazil), *P. s. andros* (Bogotá, Colombia), *P. s. semana* (Maroni, French Guiana), *P. charybdis* *semita* (Theresopolis), *P. phylleia delos* (S. E. Peru), *P. arax* (Bolivia), *P. papius pasca* (Cauca, Colombia), *P. frona* (Inca, Perene, Peru), *P. melanomerus patma* (Zamora, Ecuador), *P. placeta* (Espiritu Santo, Brazil), *P. hadassa henna* (Huambo, Peru), *P. h. hanga* (Huanaco, Pozuzo, Peru), *P. h. halma* (Bolivia), *P. terra* (Bolivia), *P. telassina tagra* AHuambo, Peru), *P. t. shiva* (2,000′, S. Ernesto, Bolivia), *P. telassa silex* (Inca, Perent, Peru), *P. sadia* (Sarayacu, Ecuador), *P. crista* (Apolobamba, Bolivia), *P. chalybea chloris* (Guerrero, Mexico), *P. hygieia zepha* (Zamora, Ecuador); *ELBELLA* (type *Pyrrhopyge seylla* Mén.), *E. intersecta strova* (Suapure, Venezuela), *E. i. peter* (Belem, Pará), *E. i. ilona* (R. Araguayra, Goyaz) *E. i. chia* (Madeira R.), *E. losca* (Chapada, Matto Grosso), *E. patrobas blanda* (Pebas, Amazonas), *E. azeta lustra* (Bogotá), *E. umbrata acala* (Manaure, Colombia), *E. etna etna* (Teffe, Amazonas), *E. e. moda* (La Merced, Peru), *E. zesta* (French Guiana); *ZONIA,* and its type *Z. zonia* (Tefte, Amazonas); *Jemadia hewitsonii pater* (Bogotá), *J. h. ovid* (Paramba, Ecuador), *J. fallax fisca* (Bogotá), *J. f. fida* (Carabaya, S. Domingo, Peru), *J. f. filta* (Pebas, Amazons); *Mimoniades lomax* (Marcapata, E. Peru), *M. montra* (Huancabamba, Peru), *M. porus mortis* (Chachapoyas, Amazons, Peru); *Ardaris eximia hantra* (Paramos de Companeiro, Est. Merida, Venezuela, 13,500′); *Amenis pionia picia* (Colombia); *HEGESIPPE* (type *Sarbia hegesippe* Mab. & Boullet); *Sarbia oneka soza* (Castro, Parana); *Metardaris cosinga catana* (Limbani, Carabaya, Peru), *M. c. circe* (Bolivia), *M. c. cedra* (Abre de Colomi, Bolivia); *Mysoria barcastus alta* (Trinidad, B. W. I.), *M. b. antila* (Santarem), *M. b. barta* (Paraguay); *Myscelus amystis mullra* (Mavea Valley, Colombia), *M. a. mysus* (Harapote, E. Peru), *M. epimachia verina* (Zamora, Ecuador), *M. e. edix* (Sapucay, Paraguay), *M. pardalina guarea* (Belem, Pará); *PASSOVA* (type *Pyrrhopyge passova* Hew.), *P. ganymedes gulia* (Loja, Ecuador), *P. g. gelina* (Chanchamayo, Peru), *P. glacia* (French Guiana), *P. greta* (Huancabamba, Peru), *P. vilna vilna* (Bueyes, Bolivia), *P. v. vanta* (Bolivia), *P. passova rudex* (Chanchamayo, Peru), *P. p. practa* (Parana), *P. p. stacer* (British Guiana); *ASPITHA* (type *Pyrrhopyge aspitha* Hew.), *A. tefta* (Teffe, Amazonas). For each form, the type locality, published figure (if any), and localities of British Museum specimens are listed. ♂ genitalia of all spp. and many sspp. are figured. The catalogue will eventually cover all American Skippers. [P.B.]

Evans, W. H., "Notes on Hesperiidæ from Madagascar (Lepidoptera)." *Naturaliste Malgache,* vol. 4: pp. 87-88, 1 fig. 1952. Describes as new *Fulda bernieri* subsp. *pauliani* and the ♂ of *F. imorina* the Tsaratanana Mts. [P.V.]

Field, William D., "A revision of *Eurema* Hübner subgenus *Teriocolias* Röber" [in English, Spanish summary]. *Acta Zool. Lilloana,* vol. 9: pp. 359-373, 3 pls. "1950" [25 Oct. 1951]. Describes as new *E.* (*T.*) *riojana mathani* (Chachapayos, Amazones, Peru). Redescribes the three spp. and the 4 recognized subspp. of *E. riojana.* Figures adults and genitalia. [P.B.]

Foltin, Hans, "*Biston* (*Pœcilopsis*) *isabellæ* Harr." [in German]. *Zeits. Wiener Ent. Ges.,* vol. 34: pp. 39-42. 15 March 1949. Distinction from *B. lapponaria:* distribution in Austria. [P.B.]

Foltin, Hans, "Eine Lokalrasse der *Oreopsyche muscella* F." [in German]. *Zeits. Wiener Ent. Ges.,* vol 35: pp. 15-16, 1 pl. 20 March 1950. Describes as new *O. m. palustrella* (Ranshofen, near Braunau a. Inn); figures adults. [P. B.]

Hasbrouck, Frank Flinn, "A revision of the Acrolophidæ (Microlepidoptera) of America north of Mexico based on the male genitalia." *Diss. Abs.,* vol. 14: pp. 426-427. Feb. 1954. [Abstract only.]

Hayward, Kenneth J., "Satiridos argentinos nuevas para la ciencia (Lep. Satyridæ)" [in Spanish, English summary]. *Acta Zool. Lilloana,* vol. 8: pp. 151-159, 3 figs. 31 Dec. 1949. Describes as new *Taygetis modesta* (Puerto Bemberg, Misiones); *Manerebia monops* (Catamarca); *Pronophila thelebe australis* (Quebrada de Lules). Proposes *NEOMANIOLA* n.n. for *Pseudomaniola* Weymer (*nec* Röber). Redescribes *Maniola yacantoensis.* [P.B.]

Hayward. Kenneth J., "Nuevas especies y formas de Riodinidæ de Argentina y Bolivia (Lep. Rhop.)" [in Spanish, English summary]. *Acta Zool. Lilloana,* vol. 8: pp. 197-201, 1 fig. 31 Dec. 1949. Describes as new *Orimba myrtis mesembrina* (Santa Cruz, Bolivia); *Apodemia castanea notia* (Villa Ana, Sta. Fe, Argentina); *Hamearis phyciodes* (Cote Lai, Sta. Fe); also describes and names two "forms" and one aberration. [P.B.]

Hayward, Kenneth J., "Nuevas especies de Lycænidæ de la Argentina (Lep. Rhop.)" [in Spanish, English summary]. *Acta Zool. Lilloana,* vol. 8: pp. 567-581, 7 figs. 31 Dec. 1949. Describes as new *Thecla amethystina* (Villa Nougués, Tucumán), *T. ellida toba* (Villarica, Paraguay), *T. ocrisia lita* (Tucumán), *T. cana* (Villa Nougués, Tucumán), *T. eumorpha* (Puerto Bemberg, Misiones), *T. vena sparsa* (Villa Nougués, Tucumán), *T. eremica* (Catamarca), *T. diaguita* (Villa Nougués, Tucumán); *Ipidecla euprepes* (Sta. María, Misiones); *Itylos oreopola* (Casa de Piedra del Río de la Puerta, Tafli, Tucumán); also one "form". [P.B.]

Hayward, Kenneth J., "Catalogo sinonimico de los ropaloceros argentinos excluyendo Hesperiidæ" [in Spanish, English summary]. *Acta Zool. Lilloana,* vol. 9: pp. 85-281. "1950" [25 Oct. 1951]. Lists the 187 genera and 650 spp. and sspp. of Papilionoidea known from Argentina, as well as described "forms" and aberrations, with references, synonymy, and known localities. Index to all names, including synonyms. [P.B.]

Hayward, Kenneth J., "Las especies y formas argentinas del genero *Adelpha* (Lep. Nymphalidæ)" [in Spanish, English summary]. *Acta Zool. Lilloana,* vol. 9: pp. 375-393, 19 figs. "1950" [25 Oct. 1951]. Lists, with notes, citations, and a key, all described species and forms known from Argentina; figures ♂ genitalia or valves of many. [P.B.]

Hayward, Kenneth J., "Estudios sobre hesperidos neotropicales (Lep. Hesp.) II. Descripciones de nuevas especies" [in Spanish, English summary]. *Acta Zool. Lilloana,* vol. 9: pp. 463-470, 5 figs. "1950" [25 Oct. 1951]. Describes as new *Carrhenes aquila* (Chapare, Bolivia); *Polites (?) inconspicua* (Chapare, Bilivia); *Niconiades scitula* (Murtinho, Matto Grosso, Brazil); *Oxynthes viricuculla* (Chapare, Bolivia); *Cobalus æthus* (Chapare, Bolivia). Figures ♂ genitalia. [P.B.]

Hayward, Kenneth J., "Más notas sobre ninfálidos argentinos" [in Spanish, English summary]. *Acta Zool. Lilloana,* vol. 10: pp. 285-290. 1952. Name changes, new synonymy, and other notes in *Anæa, Doxocopa, Ectima, Callidula, Evonyme, Sea, Historis, Cœa, Biblis, Siprœta, Yramea, Phyciodes. Adelpha arete pseudarete, Dynamine meridionalis, Nessæa obrinus* are new to Argentina. [P.B.]

Hayward, Kenneth J., "Una clave para las subfamilias, géneros y especies argentinos de la familia Heliconiidæ" [in Spanish, English summary]. *Acta Zool. Lilloana,* vol. 10: pp. 311-313. 1952. Key to Dioninæ, with 5 genera and 7 spp., and Heliconiinæ, with 3 genera and 7 spp. [P.B.]

Hayward, Kenneth J., "Clave para los géneros y especies argentinos de la familia Nymphalidæ" [in Spanish, English summary]. *Acta Zool. Lilloana,* vol. 10: pp. 401-421. 1952. Key to spp. and subspp. of 44 genera. [P.B.]

Hayward, Kenneth J., "Guia para la clasificación de las especies y formas argentinas de la familia Papilionidæ" [in Spanish, English summary]. *Acta Zool. Lilloana,* vol. 12: pp. 279-330, 8 pls. "1951" [15 Oct. 1952]. Keys to 45 spp. and "forms" of *Euryades, Atrophaneura, Battus, Graphium, Papilio;* descriptive notes and figures of wings given for all. [P.B.]

Herbulot, C., "Un Larentiinæ (Lep. Geometridæ) nouveau pour la France: *Cœnotephria ibericata* Stgr." [in French]. *Bull. Soc. Linn. Lyon,* vol. 23: pp. 65-67. 1954. A species new to France, with discussion of the generic position of *Cœnotephria, Lyncometra,* and *Lampropteryx* and general considerations about the value of the genus and its relations with the biology of the larvæ in the Larentiinæ. [P.V.]

Janmoulle, E., "La synonymie de *Tischeria angusticollella* Dup." [in French]. *Lambillionea,* vol. 52: pp. 38-41. 25 Aug. 1952. Junior synonyms are *T. aurifrontella* Rag. and *Nepticula suberoidella* Wlshm. [P.B.]

Kiriakoff, S. G., "Notes systematiques — VI. Sur la taxonomie de quelques Lépidoptères (1re partie)" [in French]. *Lambillionea,* vol. 52: pp. 41-46. 25 Aug. 1952. Places *Colias hyale* and *C. australis* in ultraspecies *hyale;* emphasizes that ultraspecies is a phylogenetic concept, not a morphological concept like a subgenus. Regards *C. hyale* as apomorphic and *C. australis* as plesiomorphic (Hennig's terms); *i. e., C. hyale* is presumed to differ less from the ancestral stock than *C. australis.* [P.B.]

Kiriakoff, S. G., "Arctiidæ nouveaux du Musée Royal du Congo belge" [in French]. *Lambillionea,* vol. 53: pp. 67-69, 93-94, 1 pl., 2 figs. 1953. Descriptions of new genus and spp. of "Arctiidæ" (Syntomidæ *auct.)* from Belgian Congo: *OREOGERYX* (type *ænea* nov.;) *Ceryx antiopa; Epitoxis stempfferi; MIRACIDION,* as subgenus of *Amata,* and its type *A.* (*M.*) *caudatula; Thyrogonia hampsoni; T. aurantiiventris.* [P.V.]

Kiriakoff, S. G., "*Elsita* nom. nov. (Lepidoptera, Thyretidæ)" [in French]. *Bull. Ann. Soc. Ent. Belg.,* vol. 90: p. 29. 1954. *ELSITA* a new name for *Elsa* Kiriakoff, 1953 (*Ann. Mus. Roy. Congo Belge, Sci. Zool.,* vol. 26: p. 23) preoccupied by *Elsa*

Honrath, 1892. [P.V.]

Kiriakoff, S. G., "On the genera *Tarsolepis* and *Dudusa* (Notodontidæ)." *Ent. Berichten*, vol. 15: p. 15. 1 Jan. 1954. Regards these genera as being distinct judging from the differences of their tympanal organs. [A.D.]

Köhler, P., "Las Noctuidæ argentinas. Subfamilia Cuculliānæ" [in Spanish, English summary]. *Acta Zool. Lilloana*, vol. 12: pp. 135-182. "1951" [15 Oct. 1952]. Describes as new (generotypes follow new genera): *CUCULLANA, C. cristagalli* La Rioja); *CHUBUTIANA, C. nigripes* (Comodoro Rivadavia, Chubut); *BORSANIA, B. mendozina* (Mendoza); *COMODORIA, C. splendida* (Comodoro Riadavia, Chubut); *ORTHOPHA, O. polypuncta* (Cipoletti, Río Negro); *METALOPHA, M. tridens* (La Rioja); *GRAPTOCULLIA, G. sagittata* (Com. Rivadavia etc., type locality not specified); *NEOQUENIA, N. nitida* (Cipoletti, Rio Negro); *MENDOZANIA, M. sanmartini* (Mendoza); *VELAZCONIA, V. difficilis* (La Rioja), *V. d. trinubila* (Comodoro Rivadavia, Chubut); *ARGYRANA, A. excellens* (Sta. Cruz); *Criophasia multilinea* (Sta. Cruz, etc.; type locality not specified), *C. obscura* (Mendoza),*C. mononacula* (Comodoro Rivadavia, Chubut); *GALEANA, G. basilinea* (Comodoro Rivadavia, Chubut); *GRISANA, G. prætiosa* (Comodoro Rivadavia, Chubut); *RIAGRIA, R. xylinoides* (Comodoro Rivadavia, Chubut); *Brachygalea nigrothorax* (Mendoza, etc.; type locality not specified), *B. grisea* (Mendoza, etc.), *B. tripunctata* (Río Agria, Neuquén, etc.), *B. exacta* (Comodoro Rivadavia, Chubut), *B. nigrovenata* (Comodoro Rivadavia, Chubut), *B. lavata* (Mendoza, etc.), *B. varians* (Río Agrio, Neuquén, etc.); *DESERTULLIA, D. argyrofulva* (Comodoro Rivadavia, Chubut); *TARSICOPIA, T. robusta* (Comodoro Rivadavia, Chubut); *METACULLIA, M. bergi* (Cipoletti, Río Negro); *PARACULLIA, P. burmeisteri* (Rio del Fondo, Sta. Cruz, etc.), *P. oorti* (Comodoro Rivadavia, Chubut); *PSEUDOSMIA, P. rubescens* (Comodoro Rivadavia, Chubut); *PAROSMIA, P. simulans* (Comodoro Rivadavia, Chubut); *Cucullia prima* (Nahuel Huapí, Neuquén), *C. glogeri* (Santiago del Estero, etc.), *C. heinrichi* (Morón, Buenos Aires, etc.), *C. giacomelli* (La Rioja); *Empusada differens* (Cipoletti, Rio Negro), *E. rectilinea* (Mendoza); *COTARSINA, C. clavata* Comodoro Rivadavia, Chubut), *C. roseofulva* (Oruro, Bolivia), *C. vivax* (Comodoro Rivadavia, Chubut, etc.); *Aporophyla albapice* (Comodoro Rivadavia, Chubut); *Omphalophora galenoides* (Comodoro Rivadavia, Chubut, etc.); *Homohadena polypicta* (Mendoza, etc.); *Brachylomia incerta* (Villa Mercedes, San Luis); *Bryotype atlantica* (Comodoro Rivadavia, Chubut); *Meganephria eremita* (Comodoro Rivadavia, Chubut); *Valeria mamestrina* (Comodoro Rivadavia, Chubut); *Hillia acronyctina* (La Rioja); *Calophasia cuculllianæ* ("Berg i.l."—no description given) (Córdoba, etc.), *C. bruchi* (Rio del Fondo, Chubut, etc.), *C. picta* (Comodoro Rivadavia, Chubut), *C. nobilis* (Mendoza, etc.), *C. funebris* (Mendoza), *C. cuyana* (La Rioja, etc.), *C. chubutiana* (Comodoro Rivadavia, Chubut); *Dasythorax santacrucis* (Sta. Cruz), *O. incaica* (Puente del Inca, Mendoza). All localities in Argentina, except for *Cotarsina roseofulva*. Holotypes or cotypes of most spp. in author's collection. No figures, no mention of genitalia. Notes on 25 previously described spp. [P.B.]

Le Charles, L., "Contribution à l'étude des zygènes *gallica-mana-erebus*" [in French]. *Rev. franç. Lépid.*, vol. 14: pp. 13-16, 6 figs. 1953. Notes on these spp. with drawings of uncus and valvæ. [P.V.]

Le Charles, L., & G. Varin, "Étude et répartition des races d'*Hipparchia statilinus* Hfn. en France" [in French]. *Rev. franç. Lépid.*, vol. 13: pp. 287-297, 5 pls. "Oct./Nov./Dec. 1952" [25 March 1953]. Describes as new: *H. s. bierica* (Forêt de Fontainebleau); *H. s. aliosicola* (Gironde); *H. s. lemovica* (Haute-Vienne); *H. s. celtica* (Causse Noir, Camprieu); *H. s. antipolitanus* (Alpes-Maritimes); *H. s. pseudelliona* (Le Var); *H. s. pradensis* (Vernet-les-Bains). Type locality given only for *H. s. celtica*. Redescribes other races; figures series of several. [P.B.]

Marion, H., "Les *Homœosoma* du groupe *nimbella* en France. *H. bentinckella* Pierce nouvelle pour la France" [in French]. *Entomologiste*, vol. 8: pp. 123-125. 1952. *H. nimbella* is not found in France and is replaced by *H. pseudonimbella* and *H. bentinckella*. [P.V.]

Marion, H., & P. Viette, "Descriptions de deux nouvelles Pyrales malgaches (Lep. Pyralididæ)" [in French]. *Bull. Soc. Ent. France*, vol. 58: pp. 39-42, 4 figs. 1953. Describes as new from central Madagascar: *Scirpophaga goliath* (Tananarive), genus *CLATRODES*[type *C. squaleralis* nov. (Ankaratra Mts.)]. [P.V.]

Marion, H., "Erreurs à rectifier" [in French]. *Rev. franç. Lépid.*, vol. 14: pp. 129-130. 1954. In Chapman's paper on *Scoparia* (1912, *Trans. Ent. Soc. London*), the figure of ♂ genitalia of *S. ochrealis* is of ♂ genitalia of *Crambus latistrius* Hw. In Pierce & Metcalfe, the ♂ genitalia with the name *Crambus lithargyrellus* are the genitalia of *C. luteelus* Schiff. [P.V.]

Marion, H., "Lectotypes de *Mecyna auralis* Peyer. et *Scoparia gallica* Peyer." [in French]. *Rev. franç. Lépid.*, vol. 14: p. 130. 1954. Designation of two lectotypes, in the Paris museum. [P.V.]

Marion, H., "Pyrales nouvelles de Madagascar" [in French]. *Bull. Soc. Ent. France,* vol. 59: pp. 24-25, 1 fig. 1954. Descriptions of two new species of Pyralididæ: *Cymoriza imperialis* from the Comoro Is. and *Nacoleia ochrimarginalis* from East Madagascar. [P.V.]

Marion, H., "Qu'est-ce que *Botys nemausalis* Dup.? (Lep. Pyraustidæ)" [in French]. *Bull. Soc. Ent. France,* vol. 59: pp. 57-60. 1954. Historical and bibliographical considerations about *B. nemausalis,* a species very rare or absent in the big collections. It belongs to Guenée's genus *Hypolais* (generotype *H. siccalis*). [P.V.]

Orfila, Ricardo N., "Notas sistematicas sobre Lepidoptera Rhopalocera" [in Spanish, English summary]. *Acta Zool. Lilloana,* vol. 8: pp. 583-586. 31 Dec. 1949. Proposes the following new higher categories (type genera in parentheses): tribes URBANINI (*Urbanus*) and PYRGINI (*Pyrgus*) for sections A and B of Pyrginæ; tribes CARTEROCEPHALINI (*Carterocephalus*) and HESPERIINI (*Hesperia*) for groups A and B of Hesperiinæ; superfamily RIODINOIDEA (*Riodina*) to replace Erycinoidea, for Riodinidæ + Lycænidæ; tribe HAMADRYINI (*Hamadryas*) to replace Ageroniidi; tribe COLOBURINI (*Colobura*) to replace Gynæciini. Corrects Caligoninæ to CALIGINÆ. Notes on the names Lampropterini, Lycænidæ, Anetiini. [P.B.]

Orfila, Ricardo N., "Nota sobre el nombre *Hamearis* Hübner" [in Spanish, English summary]. *Acta Zool. Lilloana,* vol. 8: pp. 603-605. 31 Dec. 1949. Points out that *Hamearis* and *Nemeobius* are both valid and refer to different genera. [P.B.]

Ortner, Anton, "*Coleophora supinella* nov. spec. (Lep., Coleophoridæ)" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 34: pp. 117-123, 1 pl. 15 Sept. 1949. New species from Haimburger Mts., on *Cytisus supinus:* describes and figures larva, adult, and genitalia, and gives distribution of foodplant. [P.B.]

Overlaet, F. G., "Formes nouvelles ou peu connues de nymphalides africains" [in French]. *Ann. Mus. Roy. Congo Belge,* ser. 8, no. 14: 50 pp., 9 figs. 1952. Revisional notes on *Harma* and *Cymothoë.* Describes as new: *C. lurida tristis* (Sassa, Belgian Congo); *C. l. centralis* (R. Luakile, Kirda, Katanga); *C. hesiodotus clavior* (Kindu, Belgian Congo); *C. fontainei* (Lutahe, Belgian Congo; *C. f. debauchei* (Etoumbi, French Congo); *C. eris sankuruana* (Beni-Bendi, Sankura); *C. coccinata bergeri* (Etoumbi); *C. c. fontinalis* (Muetshi, Sankura); *C. reginæ-elizabethæ belgarum* (Katakoli); *C. sangaris mwami-kazi* (Beni). Proposes *C. druryi* as new name for *C. althea* Drury. Considers *C. cænis* form *mundamensis* a good species. Also describes some "forms". Few figures. [P.B.]

Pastrana, José A., "Una nueva peste en araucarias de Misiones (Republica Argentina)" [in Spanish]. *Revista Invest. Agric.,* vol. 4: pp. 243-244, 2 pls. "April 1950" [Feb. 1951]. Describes as new *Laspeyresia araucariæ* (San Antonio, Misiones, Argentina); bred from *Araucaria angustifolia.* [P.B.]

Pastrana, José, "Una especie nueva de Glyphipterygidæ de la Argentina (Lepidoptera)" [in Spanish, English summary]. *Acta Zool. Lilloana,* vol. 12: p. 519. '1951' [15 Oct. 1952]. Describes as new *Antispastis clarkei* (Zona del Tigre, Prov. Buenos Aires, on *Solanum bonariense*); figures venation and genitalia. [P.B.]

Pinker, Rudolf, "Studien über die *Cidaria olivata* Schiff.-Gruppe. Larentiinæ. *Cidaria* Tr. Subgenus: *Calostigia* Hbn. Abt. A" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 38: pp. 31-33, 4 figs. 1 March 1953. Describes as new *C. olivata gigantea* (Col di Sestriere, 1600-2100 m., Piemont); *C. o. hiloriata* (Albarracin, Aragon, Spain); *C. wolfschlägeræ* (Ochrida, Macedonia). Figures ♂ genitalia of these spp. and of *C. fitzi.* [P.B.]

Plantrou, J., "Capture d'un hybride *hero-arcania*" [in French]. *Rev. franç. Lépid.,* vol. 13: p. 129. "Nov./Dec. 1951" [28 March 1952]. *Cœnonympha* hybrid.

Réal, P., "Observations sur quelques formes de *Cnephasia* de la Collection Cleu" [in French]. *Rev. franç. Lépid.,* vol. 13: pp. 220-222. "March/April" [25 July] 1952. Proposes *C. wilkinsoni* n.n. for *C. chrysantheana* auct. (*nec* Wilkinson) and discusses correct application of names in this group. Names several "varieties". [P.B.]

Réal, P., "Catalogue des espèces françaises du genre *Cnephasia* Curt." [in French]. *Bull. Mens. Soc. Linn. Lyon,* vol. 22: pp. 51-62, 8 figs. 1953. A list with the geographical distribution and the study of the male genitalia of the species of *Cnephasia* of the French fauna. New subgenera are described: *ANOPLOCNEPHASIA* (type *A. sedana* Crt.), *NEOSPHALEROPTERA* (type *N. nubilana* Hbn.), *BRACHYCNEPHASIA* (type *B. longana* Hw.); and new spp.: *C.* (*Nephodesme*) *legrandi* (South Alps), *C.* (*N.*) *viardi* (South Alps), *C.* (*N.*) *cyanescana* (South Alps), *C.* (*C.*) *pulmonariana* (Seine-et-Oise). Unfortunately many individual forms are named and described. The author ignores the meaning of holotype and allotype; corrigenda are given in *Bull. Mens. Soc. Linn. Lyon,* vol. 22: p. 98; 1953. [P.V.]

Reisser, H., "Synonymie-Notizen zum Aufsatz Rebelt: 'Neue Heteroceren aus Aegypten'." [in German]. *Zeitschr. Wiener Ent. Ges.,* vol. 33: pp. 43-44. 1 Oct. 1948. Sinks Rebel's spp.: *Tarache grisescens* = *T. biskrensis* Obthr.; *Ozarba cervina* = *O. timida* Berio; *O. elaphina* = *O. variabilis* Berio. [P.B.]

Remington, C. L., "The sibling species of budmoth in Canada." *Lepid. News,* vol. 7: pp. 57-58. 29 July 1953.

Roepke, W., "Quelques espèces des genres *Trabala* Walk. et *Crinocraspeda* Hamps. du Muséum de Paris (Lep. Lasiocampidæ)" [in French]. *Rev. franç. Lépid.,* vol. 14: pp. 3-4, 1 pl. Describes and figures the ♀ of *C. torrida,* [P.V.]

Ronniger, Hermann, "Bemerkungen über *Depressaria alpigena* Frey und *ragonoti* Rebel" [in German]. *Zeitschr. Wiener Ent. Ges.,* vol. 31: pp. 147-160 5 figs. 15 Mar. 1948. Concludes, on the basis of distribution, structure, and food plant (*Laserpitium siler*) that *ragonoti* is a subspecies of *D. alpigena.* Describes larvæ and adults and figures ♂ genitalia. Summarizes records of the *Depressaria* feeding on *Laserpitium* spp. [P.B.]

Rungs, Ch., "Un nouveau *Tarache* d'Afrique du Nord (Lep. Phalænidæ)" [in French]. *C. R. Soc. Sci. Nat. Maroc,* 1953, no. 1: pp. 16-18, 2 figs. 1953. Describes as new *T. mekkei* (Oran, Algeria). [P.V.]

Rungs, Ch., "Le complexe de *Leucania loreyi* auct. nec Dup. (Lep. Phalænidæ)" [in French]. *Bull. Soc. Ent. France,* vol. 58: pp. 138-141, 2 fig. 1953. Under the name *L. loreyi* Dup. different species are mixed. The author has seen Duponchel's lectotype ♂. Describes new subgenus: *ACANTHOLEUCANIA* (type: *L. loreyi* Dup.) with two new species: *A. loreyimima* (Cochin China) and *L. pseudoloreyi* (Madagascar). [P.V.]

Rungs, Ch., "Un nouveau Lépidoptère Pyralididæ du Maroc: *Synaphe mediatlantis* n. sp." [in French]. *C. R. Soc. Sci. Nat. Maroc,* 1953, no. 5: pp. 71-72. 1953. Description of a new sp. from the Middle Atlas; no figure. [P.V.]

von Schantz, Max, "*Tinea montelliella* n. sp. (Lep., Tineidæ) aus Fennoskandien" [in German]. *Notul. Ent.,* vol. 31: pp. 18-20, 3 fig. May 1951. Describes as new *T. montelliella* (Muonio, Finnish Laplan). ♂ genitalia of this sp., *T. insectella, T. fuliginosella* figured. [W. H.]

von Schantz, Max, "Beitrag zur Kenntnis dreier *Phthorimæa*-Arten (Lep., Gelechiidæ). *Phthorimæa hackmani* n. sp." [in German]. *Notul. Ent.,* vol. 32: pp. 15-22, 6 figs. Aug. 1952. Describes as new *P. hackmani* (Säkylä, South Finland). Figures ♂ and ♀ genitalia of this sp. and two allied Finnish spp. [W.H.]

Shakhbazov, V. G., "The systematic position and the distribution of the Ussuri silkworm" [in Russian]. *Zool. Zhurn.,* vol. 32: pp. 472-477. May/June 1953. [Not seen.]

Sieder, Leo, "*Rebelia marpessa* (spec. nov.)" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 32: pp. 22-25, 1 pl., 2 figs. 15 Apr. 1948. Type locality Kärtnen, east of Klagenfurt; on *Thymus* and grasses. [P.B.]

Sieder, Leo, "*MONTANIMA* gen. nov. (Lep. Psychidæ)" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 34: pp. 2-9, 1 pl., 4 figs. 1 Feb. 1949. Type *Rebelia karawankensis.* Describes as new *M. predotæ* (Albania). [P.B.]

Sieder, L., "Berichtigung." *Zeits. Wiener Ent. Ges.,* vol. 34: p. 51. 15 March 1949. Designates *M. karawankensis* as generotype of his genus *Montanima* (Described in vol. 34: pp. 2-9). [P.B.]

Sieder, Leo, "*Talæporia tubulosa bavaralta* ssp. n., eine neue Unterart aus den Berchtesgadner Alpen (Lepidoptera, Psychidæ)" [in German]. *Nachrbl. Bayer. Ent.,* vol. 2: pp. 52-55. 15 July 1953.

Skala, Hugo, "Zur Frage der Miner (Nepticulidæ)" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 32: pp. 121-122. 30 June 1948. Describes as new *Nepticula* *purpureæ* (Leipnik, Mähren, on *Salix purpurea*). Notes on synonymy and biology. [P.B.]

Stempffer, H., "Contribution à l'étude de quelques Lycènes d'Europe occidentale" [in French]. *Lambillionea,* vol. 53: pp. 12-18. 1953. Notes on some species of Lycænidæ from Spain and France. [P.V.]

Stempffer, H., "Contribution à l'étude des Lycænidæ de l'Afrique équatoriale" [in French]. *Ann. Mus. Roy. Congo Belge, ser. in 8°, Sci. Zool.,* no. 27: 48 pp., 16 figs. 1954. Important study on the Lycænidæ from equatorial Africa. Describes as new: *Liptena jacksoni* (Uganda); *Eresina vansomereni* (Uganda);*Argiolaus bergeri* (Belgian Congo); *Teratoneura isabellæ congoensis* (Belgian Congo); *Hemiolaus cæculus littoralis* (Mombasa Coast); *Iolaus (Epamera) alienus ugandæ* (Uganda); *Anthene sylvanus niveus* (Belgian Congo). A new name, *Deudorix (Pilodeudorix) ankoleensis,* is given for *Philodeudorix camerona ugandæ* Stempffer. [P.V.]

Storace, Luciano, "Recherches sur le groupe africain de *Papilio nireus* L. (Lepidoptera, Diurna)" [in French]. *Lambillionea,* vol. 51: pp. 44-52, 73-76; vol. 52: pp. 9-11, 14-20, 30-35, 75-76. 25 Aug., 25 Oct., 25 Dec. 1951; 25 Feb., 25 April, 25 June, 25 Dec. 1952. Describes as new *P. sosia debilis* (Uganda); *P. bromius chrapkowskoides* (Uganda); *P. nireus micronireus* (West Africa); localities given but no type localities or holotypes specified. Also names many infrasubspecific forms. Attempts to cover geographic and individual variation in *P. sosia, P. brontes, P. æthiops, P. bromius, P. nireus;* only size and pattern characters are considered. No figures. [P.B.]

Tams, W. H. T., "The genus *Alompra* Moore (Lepidoptera, Lasiocampidæ)." *Tijdschr. Plantenziekten,* vol. 39: pp. 165-168, 16 figs. 1953. Describes as new *A. ferruginea bidiensis* (Bidi, Sarawak); *A. f. cerastes* (Surgiao, Mindanao, Philippine Is.); *A. roepkei* (Assam), *A. r. sarotes* (Bukit Kutu, Selangor), *A. r. pella* (Upper Palembang, Sumatra). Figures neuration, adults, genitalia. [A.D.]

Toll, S., "Beiträge zur Mikrolepidopterenfauna von Nordost-Persien" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 32: pp. 107-116, 3 pls. 30 June 1948. Report on a collection from Kuh-i-mirabi Range at 2000 m. Describes as new: (Pyralididæ) *Crambus persellus, C. craterellus defesselus, Anoristia mirabiella, Salebria pallidella. S. semirubella hyrcana, Nephopteryx persarum, Pristophora velocella, Pristocera pallidisignata, Scoparia hyrcanella, Evergestis ænealis obscura, Pionea pyraustiformis, P. pionalis;* (Tortricidæ) *Phalonia posterana hyrcana, P. subposterana;* (Gelechiidæ) *Gelechia hyrcanella, Lita griseofusella, L. detersipunctella, Pleurota lineata;* (Hyponomeutidæ) *Argyresthia myrabiella, Cerostoma kotschi.* Figures adults and genitalia of new spp. and of some new sspp. Lists other spp. of these families, Pterophoridæ, Momphidæ, and Tineidæ. [P.B.]

Toll, S., "Studien über die Genitalien einiger Coleophoriden. XI." [in German]. *Zeits. Wiener Ent. Ges.,* vol. 37: pp. 156-164, 2 pls. 15 Dec. 1952. Describes as new: *Coleophora mœstella* (Rheinpfalz); *C. dichroella* (Siebenseental, Carniola); *C. klimeschiella* (Nyir, Hungary); *C. fuscatella* (Donnersberg); *C. dannehli* (Veldes, upper Carniola); *C. dentiferella* (Hainburg, Austria); *C. palumbipenella* (Klosterneuburg, near Vienna); *C. altivagella* (Gurgl, Otztal, Tirol); *C. burmanni* (Brenner); *C. eudoriella* (Deutsch-Altenburg, Austria); *C. opacella* (Bisamburg, near Vienna); *C. baltica* (Amata, Latvia); *C. pseudociconiella* (Vienna); *C. distinctella* (Tirol). Figures genitalia of known sexes. [P.B.]

de la Torre y Callejas, S. L. & P. A. Dalmau, "Una lista de las Euremas de America, con notas sobre las especies colectadas en Cuba" [in Spanish]. *Publ. Univ. Oriente Dept. Ext. Rel. Cult.* 27: 38 pp., 8 pls. 1953. List, with geographic distribution, of all *Eurema,* including forms. Cuban spp. extensively discussed and new form of *E. laræ* named and figured. 78 photos of Cuban spp. [C.R.]

de Toulgoët, H., "Contribution à l'étude des *Eilema* français (Arctiidæ Lithosiinæ)" [in French]. *Rev. franç. Lépid.,* vol. 13: pp. 181-184, 2 figs. "Jan./Feb." [31 May] 1952. Distinguishes between *E. uniola, E. caniola, E. interposita,* and figures ♂ genitalia of first two. [P.B.]

de Toulgoët, H., "Contribution à l'étude des *Eilema* paléarctiques (3^e note). Note sur *Eilema uniola* Rbr. (Lep. Lithosiidæ)" [in French]. *Bull. Soc. Ent. France,* vol. 58: pp. 55-57. 1953. Historical and bibliographical notes and geographical distribution of this badly known species. Lectotype designated. [P.V.]

de Toulgoët, H., "Contribution à l'étude des *Eilema* paléarctiques (4^e note). Qu'est-ce qu'*Eilema sordidula* Rbr.? (Lep. Lithosiidæ)" [in French]. *Bull. Soc. Ent. France,* vol. 59: pp. 36-39. 1954. Lectotype of *E. sordidula* designated. Study shows that *sordidula* is a synonym of *E. pallifrons.* [P.V.]

Urbahn, Ernst, "Die Unterschiede der Jungenstände und Falter von *Melitæa athalia* Rott., *britomartis* Assm. und *parthenie* Bkh. = *aurelia* Nick. in Deutchland (Lep.)" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 37: pp. 105-121, 5 pls. 15 Nov. 1952. Compares all stages of these species, as well as genitalia of both sexes, and describes all points of difference; many fine figures. [P.B.]

Urbahn, Ernst, "Über die Artberechtigung von *Melitæa veronicæ* Dorfmeister auf Grund von Typenuntersuchungen" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 38: pp. 87-94, 5 figs. 30 April 1953. Confirms, from study of describer's specimens of larvæ and pupæ, that *M. veronicæ* is a synonym of *M. britomartis.* [P.B.]

Varin, G., "Contribution à l'étude des Satyridæ de France. Les races françaises de *Cœnonympha œdippus* Fabricius" [in French]. *Lambillionea,* vol. 52: pp. 5-8. 25 Feb. 1952. Describes as new *C. œ. sebrica* (Bourdet, Deux-Sevres); *C. œ. aquitanica* (Gazinet, Gironde); *C. œ. herbuloti* (Backais, Isere). [P.B.]

Verity, R., "Les noms des Zygènes *gallica-mana-erebus,* d'apres les règles de la nomenclature zoologique" [in French]. *Rev. franç. Lépid.,* vol. 14 pp. 50-51. 1953. *Zygæna erebus* Stgr. = *erebæa* Brgff.; *Z. mana* Kirby = *interrupta* Brgff. = *chaos* Brgff.; *Z. gallica* Obth. race *interrupta* Boursin = race *giesekingiana* Reiss. [P.V.]

Viette, P., "Sur la systématique du genre *Oxyptilus* Z." [in French]. *Entomologiste,* vol. 8: pp. 93-94. "1952" [1953]. Abstract, for the French fauna, of the work of ST. ADAMCZEWSKI; lectotypes designated for *Oxyptilus maculata* and *O. lantoscana.* [P.V.]

Viette, P. E. L., "Contribution à l'étude des Hepialidæ (30^{e} note)" [in French]. *Lambillionea,* vol 53: pp. 32-35, 2 fig. 1953. Describes as new: genus *XHOAPHRYX* [type *X. leméci* nov. (Indochina, Tonkin)]; gives synonymy of *Hepialiscus algeriensis* and *Hepialus tunctanus;* and places *fuscoargenteus* in the genus *Gazoryctra* Hb. [P.V.]

Viette. P., "Nouvelles Pyrales de Madagascar (Lepid.)" [in French]. *Rev. franç. Ent.,* vol. 20: pp. 130-137, 6 figs. 1953. Describes as new: *Neopaschia nigromarginata* (E. Madagascar), genus *CATALAODES* [type *C. malgassicalis* nov. (E. Madagascar)], *Sindris boisduvalalis* (central Madagascar), *S. catalalis* (E. Madagascar), *Polygrammodes seyrigalis* (S.-central Madagascar), *Mecyna catalalis* (S. Madagascar), *Stenia mabillealis* (E. Madagascar). [P.V.]

Viette, P. E. L., "Descriptions de deux nouveaux Microlépidoptères de l'Île Maurice" [in French]. *Bull. Soc. Zool. France,* vol. 78: pp. 138-141, 2 figs. 1953. Describes as new *Stagmatophora vinsoni* and *Thiognatha mameti,* from Mauritius. [P.V.]

Viette, P. E. L., "Descriptions de nouvelles espèces de Pyrales de la faune malgache (Ins. Lepid.)" [in French]. *Bull. Mens. Soc. Linn. Lyon,* vol. 22: pp. 203-209, 5 figs. 1953. Descriptions of new genera and spp. from Madagascar: *MARIONODES seyrigalis* (generotype) (far south); *HAPLOSINDRIS* (generotype *leucotriangula* Mab.); *JAKUARTE marinalis* (generotype) (east); *Mussidia decaryalis* (far south); *Dichocrocis catalalis* (east); *D. alluaudalis* (far south). [P.V.]

Viette, P. E. L., "Étude de quelques vieux types de *Procris* Fabricius (Lepidopt. Zygænidæ)" [in French]. *Lambillionea,* vol. 53: pp. 38-45, 10 figs. 1953. Gives figures, discussions, lectotype designation for *P. cognata* H. Lucas, *P. cirtana, P. bellieri, P. cognata* Rambur, *P. soror.* [P.V.]

Viette, P. E. L., "Nouveaux deltoïdes de Madagascar (Lep. Noctuidæ)" [in French]. *Bull. Soc. Linn. Lyon,* vol. 23: pp. 67-72, 6 figs. 1954. Descriptions of new species of Noctuidæ Hypeninæ from central Madagascar: *Marca griseonigralis; Olybama pyraustalis, Dragana elongalis; Madopa mabillealis, M. saalmülleralis; Deinypena biplagalis.* [P.V.]

Viette, P. E. L., "Description de nouvelles espèces de noctuelles quadrifides de Madagascar" [in French]. *Bull. Soc. Zool. France,* vol. 78: pp. 341-348. "1953" [1954]. Descriptions of a new genus and spp. of Noctuidæ Ophiderinæ from Madagascar: *ANDRIANAM poinimerina; Paralephana descarpentriesi, P. decaryi, P. catalai, P. subpurpurascens; Egnasia berioi; Promimea jeanneli.* [P.V.]

Wehrli, E., "Une nouvelle classification du genre *Gnophos* Tr." [in French]. *Lambillionea,* vol. 51: pp. 6-11, 22-30, 34-37. 25 Feb., 25 April, 25 Aug. 1951. New classification based largely on ♂ genitalia. Describes as new (types in parentheses):

subgenera *DICROGNOPHOS* (*G. orthogonia*); *LYCOGNOPHOS* (*G. obscurata*); *KENTROGNOPHOS* (*G. onustaria*); *SACROGNOPHOS* (*G. sacaria*); *RHINOGNOPHOS* (*G. similaria*); *COSTIGNOPHOS* (*G. pullulata*); *DYSGNOPHOS* (*G. difficilis*); *NEOGNOPHINA* (*G. intermedia*); *RHOPALOGNOPHOS* (*G. glaucinaria*); *ORGANOGNOPHOS* (*G. sibiriata*); *EUCHROGNOPHOS* (*G. variegata*); *PTERYGNOPHOS* (*G. ochrofasciata*); *RHIPIGNOPHOS* (*G. pervicinaria*); *CNESTROGNOPHOS* (*G. præacutaria*); *CHELEGNOPHOS* (*G. ravistriolaria*); and *SUBDISCHIDESIA* (subgenus of *Dischidesia*, which is raised to generic rank; for *G. lilliputata* and *G. hypochrysa*, type not specified); and genera *ODONTOGNOPHOS* (*G. dumetata*); *ECODONIA* (*Hydrelia tchrinaria*). New entities and previously accepted genera and subgenera are described and the included spp. listed; 5 spp. not yet sufficiently studied are also listed. Proposes *G. sphærula* n.n. for *G. perdita* Stgr. *nec.* Btlr. (=*pærlitæ* Leech *nec* Btlr.). Also mentions several "new species" not described here, and "new subgenera" (for spp. transferred from *Gnophos*) not described and without type citation. The paper is further marred by the author's failure to state the rank of previously described entities (*Zystrognophos*, in fact, is called both a subgenus of *Gnophos* and a distinct genus) and by the absence of illustrations. [P.B.]

Wiltshire, E. P., "Middle East Lepidoptera. XII: two new species from south-west Persia (Iran)." *Proc. Roy. Ent. Soc. London B*, vol. 22: pp. 217-219, 2 figs. 31 Dec. 1953. Describes as new *Arenostola delattini* (near Shiraz, 5500'); *Porphyrinia popovi* (Shiraz, 6000'); both Agrotidæ. [P.B.]

Wise, K. A. J., "Occurrence of the Oak Blotch Miner *Lithocolletis messaniella* (Lepidoptera: Gracillariidæ) in New Zealand." *Trans. Roy. Soc. New Zealand*, vol. 81: pp. 65-66, 1 pl., 1 fig. June 1953. Redescribes genus and species; figures forewing and mines. Lists food plants. New record. [P.B.]

Wohlfahrt, Th. A., "*Colias australis* Vrty. (Lep. Rhopal.) im mittleren Maingebiet" [in German]. *Nachrbl. Bayer. Ent.*, vol. 1: pp. 13-14. 15 Feb. 1952. Records; characters. [N.O.]

Wolfsberger, Josef, "Eine neue Form von *Crymodes zeta* Tr. aus den Ostalpen (Lep. Noct.)" [in German]. *Nachrbl. Bayer Ent.*, vol. 1: pp. 30-31. 15 April 1952. Describes as new *C. z. rofana* (Rofan Prov., N. Tirol). [N.O.]

D. VARIATION AND GENETICS

Alexandre, R., "Une nouvelle aberration de *Parnassius apollo* L., ab. ♂ *inocellata*, nova" [in French]. *Rev. franç. Lépid.*, vol. 13: p. 235. "May/June/Sept." [15 Nov.] 1952

Aubert, Jacques-F., "*Apamea secalis* L. forme *struvoculea* Aubert (Lep. Phal.)" [in French]. *Ent. Nachrbl.*, vol. 4: pp. 59-61, 5 figs. Apr./Dec. 1952. Describes a ♀ form.

Aubert, Jacques-F., "Note sur les formes mélanisantes des Papilionides d'Europe centrale" [in French]. *Rev. franç. Lépid.*, vol. 13: pp. 236-239. "May/June/Sept." [15 Nov.] 1952. Notes described melanic forms of *Papilio machaon, P. podalirius, Parnassius apollo* [P.B.]

Bernardi, G., & R. Gaillard, "Les *Maculinea* du Mont Aigoual (Gard) (Lep., Lycænidæ)" [in French]. *Rev. franç. Lépid.*, vol. 13: pp. 113-114. "Sept./Oct." [28 Dec.] 1951. Describes local races of *M. alcon* and *M. arion*. [P.B.]

Bourgogne, Jean, "La variation intraspécifique chez les Lépidoptères" [in French]. *Rev. franç. Lépid.*, vol. 13: pp. 65-77. "May/June" [10 Aug.] 1951. Survey of possible types of infraspecific variation, from teratological to geographic, and their causes; with examples. [P.B.]

Burmann, Karl, "Eine neue Form von *Parnassius apollo* L. var. *claudius* Bell. f. .g. *Phrynius* Fruhst." [in German]. *Zeits. Wiener Ent. Ges.*, vol. 34: pp. 42-43, 2 figs. 15 March 1949. Names an aberration.

Burmann, Karl, "Zwei neue Formen von *Anisotænia ulmana* Hb. aus Nortirol (Lepidoptera, Tortricidæ)" [in German]. *Zeits. Wiener Ent. Ges.*, vol. 34: pp. 43-44, 4 figs. 15 March 1949. Names two aberrations.

Burmann, Karl, "*Gracilaria populetorum* Z." [in German]. *Zeits. Wiener Ent. Ges.*, vol. 35: pp. 17-20. 20 March 1950. Names 3 aberrations and describes other variants. [P.B.]

Caruel, Marcel, "Révision des formes et aberrations du Catalogue des Rhopalocères" [in French]. *Rev. franç. Lépid.*, vol. 13: pp. 84-87, 117-121. "May/June" [10

Aug.], "Sept./Oct." [28 Dec.] 1951. Brief redescriptions of described aberrations of *Papilio podalirius, P. machaon, Aporia cratægi*; color of melanic *P. podalirius* accompanies the second part. [P.B.]

Caspari, Ernst, "On the selective value of the alleles Rt and rt in *Ephestia kühniella.*" *Amer. Nat.,* vol. 84: pp. 367-380, 3 figs. Sept./Oct. 1950. Evidence is presented for the selective advantage of the heterozygote. Gene affects testis color. [P.B.]

Chu Hsi, "Heterospermic impregnation in silkworms and its role in hereditation" [in Russian]. *Izv. Akad. Nauk SSSR, Ser. Biol.,* 1953: pp. 52-62. [Not seen].

Daniel, Franz, "Melanistische Lepidopteren-Formen aus Südbayern" [in German]. *Nachrbl. Bayer. Ent.,* vol. 1: pp. 2-4. 15 Jan. 1952. Discusses melanistic aberrations; names two. [N.O.]

Daniel, Franz, "Die Formen von *Glyphisia crenata* Esp." [in German]. *Nachrbl. Bayer. Ent.,* vol. 2: pp. 65-69. 15 Sept. 1953. Discusses variation and distribution [N.O.]

Daniel, Franz, "Zwei neue Endrosinæ-Formen" [in German]. *Nachrbl. Bayer. Ent.,* vol. 2: pp. 82-83. 15 Nov. 1953. Describes and names 2 aberrations. [P.B.]

Dowdeswell, W. H., & E. B. Ford, "The influence of isolation on variability in the butterfly *Maniola jurtina* L." *Symp. Soc. Exper. Biol.,* no. 7: pp. 254-273, 2 maps. 1953. Data on the frequency distribution of hindwing spots in local populations of this satyrid in England and adjacent islands. [P.B.]

Foltin, Hans, "Die Verbreitung der dunklen Formen von *Aglia tau* L., mut. *ferenigra* Th. Meig. und *melaina* Gross." [in German]. *Zeits. Wiener Ent. Ges.,* vol. 33: pp. 18-21. 1 Oct. 1948. Distribution in Austria of these melanic mutants. [P.B.]

Hardonk, M., "*Comibæna pustulata* Hufn. f. *rosea* Cockayne (Lep. Geom.)" [in Dutch, English summary]. *Ent. Berichten,* vol. 15: p. 20. 1 Feb. 1954.

Hoffmann, Emil, "Neue *Parnassius mnemosyne* L. — Aberrationen" [in German]. *Ent. Nachrbl.,* vol. 3: pp. 177-181, 1 pl. Oct./Nov. 1951. Names 15 aberrations and figures 8. [P.B.]

Hoffmann, Emil, "Richtigstellung von Aberrationsnamen bei unserenheimischen *Parnassius*-Arten" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 38: pp. 12-18. 1 March 1953. Redescriptions of named aberrations of *P. mnemosyne, P. apollo,* and *P. phœbus,* and correction of the nomenclature. [P.B.]

Hovanitz, William, "Polymorphism and evolution." *Symp. Soc. Exper. Biol.,* no. 7: pp. 238-253, 1 pl., 3 figs. 1953. Chiefly a discussion of the color polymorphism of females in populations of some species of *Colias.* [P.B.]

Kühn, Alfred, & Analiese Berg, "Eine neue Mutation mit wechselnder und zeitlich beschränkter Wirkung bei *Ptychopoda seriata*" [in German]. *Zeitschr. Naturwiss.,* vol. 6B: pp. 41-44, 5 figs. 1951. Reports incompletely dominant gene causing malformations of wing scales and acting in limited but variable period in wing development. [P.B.]

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Neschner, E., "*Pieris bryoniæ* O. subsp. *flavescens* Wagn. und subsp. *neobryoniæ* Shelj. Ihre Rückschlagsformen mod. ♀ *bryoniæformis* Müll., mod. ♀ *schimæ* Mull. Benennung und Beschreibung ihrer Sonderformen" [in German]. *Ent. Nachrbl.,* vol. 4: pp. 76-79. Apr./Dec. 1951. Describes and names 20 "forms" of two similar ♀ forms of these two subspecies, being all possible combinations of forewing and hind-wing patterns and ground color in the two (previously named) generation forms. This is nomenclature refined to the limit, but not entomology. [P.B.]

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J. MISCELLANY

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Zahl, Paul A., "Back-yard monsters in color." *Nat. Geogr. Mag.,* vol. 102: pp. 235-260, 16 pls., 7 figs. July 1952. Good figures of some common insects, including Lepidoptera. [P.B.]

The Lepidopterists' Society

CONSTITUTION AND BY-LAWS

(As amended 31 December 1954)

WHEREAS, The Lepidopterists' Society was formed on May 4, 1947, to promote the scientifically sound and progressive study of Lepidoptera by —

1. publishing a periodical on Lepidoptera,
2. facilitating the exchange of specimens and notes by both the professional worker and the amateur in the field,

AND WHEREAS, it is now proposed to organize said Society in a more formal manner, the following Constitution and By-Laws are hereby adopted by the duly appointed Organization Committee. [1 October 1950]

CONSTITUTION

Article I. NAME

Section 1. The organization shall be known as The Lepidopterists' Society.

Article II. OBJECT

Section 1. It shall be the purpose of the Society to promote internationally the science of lepidopterology in all its branches; to further the scientifically sound and progressive study of Lepidoptera; to publish a periodical and other publications on Lepidoptera; to facilitate the exchange of specimens and ideas by both the professional worker and the amateur in the field; to secure cooperation in all measures tending to that end, and to facilitate personal intercourse among its members.

Article III. MEMBERSHIP

Section 1. All persons interested in lepidopterology shall be eligible for membership.

Section 2. All individual subscribers to *The Lepidopterists' News,* who have paid their current annual dues, shall be deemed members of the Society.

Section 3. The membership of the Society shall consist of four classes — Active, Sustaining, Life, and Honorary Members. All persons who joined the Society before January 1, 1948, shall be designated Charter Members.

Section 4. Application for Active, Sustaining, and Life membership in the Society, received by the Secretary or Treasurer and accompanied by the annual dues for the current year, shall constitute formalization of membership, and no nomination or election to membership shall be necessary. The annual dues shall be fixed by the By-Laws.

Section 5. Any member may become a Life Member upon the payment, at one time, of such sum as shall be fixed by the By-Laws, and shall be exempt from further assessment. He shall receive during his life a subscription to *The Lepidopterists' News.* Life Membership fees shall be placed in a permanent Publication Fund.

Section 6. Individuals who have made important contributions to the science of lepidopterology may be elected Honorary Members of the Society. There shall not be more than ten living Honorary Members.

Section 7. Members one year in arrears in the payment of dues shall be dropped from the rolls by the Secretary.

Section 8. The Executive Council may expel any member of the Society for such cause as it may deem sufficient for expulsion. This action may be taken only after unanimous approval by members of the Council. Petition for expulsion shall be presented to the Secretary for presentation to the Council. On expulsion, the departing member shall be refunded all dues paid for the current year. An expelled member may be reinstated by unanimous affirmative vote of the Council.

Article IV. OFFICERS

Section 1. The officers of the Society shall consist of a President, three Vice-Presidents (not more than one of whom shall reside in one country), a Secretary, and a Treasurer, but these last two offices may be filled by the same person.

Section 2. The business and affairs of the Society, not otherwise provided for, shall be controlled by an Executive Council, consisting of the President, three Vice-Presidents, the Secretary, the Treasurer, the Editor-in-Chief, and six other members of the Society. Action on all amendments to the By-Laws and all appointments and elections by the Executive Council shall be obtained by a canvass by the Secretary of all members of the Council.

Section 3. The Executive Council may appoint one or more Assistant Secretaries or Assistant Treasurers to serve during the pleasure of the Council. The offices of Assistant Secretary and Assistant Treasurer may be filled by the same person.

Section 4. The Executive Council shall have power to make and adopt By-Laws for the conduct of the business and affairs of the Society and for the regulation of its procedure not inconsistent with the terms and provisions of the Constitution.

Article V. ELECTIONS

Section 1. The President shall before the first of July appoint a Nominating Committee who shall nominate one candidate for each elective office to be filled for the ensuing year, and a list thereof shall be published in *The Lepidopterists' News* or mailed to the members at least sixty days before ballots are mailed by the Secretary. Additional candidates may be nominated by submission to the Secretary of written nominations signed by not less than ten members. Ballots containing all nominations shall be mailed in November of each year, setting forth the officers to be elected and the names of those nominated for each office. If more than one person is nominated for any office, their names shall be arranged alphabetically on the ballot.

Section 2. Election of Officers. All officers shall be elected by ballot. The President and all Vice-Presidents shall be elected for the term of one year, and shall be eligible to succeed themselves once. The Secretary and Treasurer shall be elected for the term of three years and shall be eligible to succeed themselves twice. The six other elective members of the Executive Council shall be elected for the term of three years; two of them shall be replaced each year; these members shall not be eligible to succeed themselves. For each office, the nominee receiving the highest number of ballots shall be elected. Officers shall take office at the beginning of the calendar year for which they are elected.

Section 3. Election of Honorary Members. Honorary Members shall be nominated by the unanimous vote of the members of the Executive Council. The nominee shall be voted on by mail ballot distributed to all members of the Society and reported in *The Lepidopterists' News,* and must receive 80% of all ballots cast to be elected. Not more than five Honorary Members may be elected at the first annual meeting, and not more than two in any one calendar year.

Article VI. DUTIES OF OFFICERS

Section 1. The President shall preside at all meetings. He shall appoint all committees and be Chairman of the Executive Council and a member *ex officio* of all other committees, except the Editorial Board. He may appoint also delegates to other learned societies, Congresses, and conventions.

Section 2. The First Vice-President shall assume the duties of the President in case of his death, resignation, absence, or disability.

Section 3. In case the President and all Vice-Presidents are absent at a meeting, a temporary Chairman may be chosen by a majority vote of the members of the Executive Council present from among themselves.

Section 4. The Secretary shall keep the minutes of the meetings of the Society and of the Executive Council; shall give notice of the meetings of the Society; shall attend to all general correspondence; shall keep all records and files of the Society; shall prepare and distribute ballots; and shall generally perform all services that may be delegated to him.

Section 5. The Assistant Secretary shall assume the duties of the Secretary in case of the death, resignation, absence, or disability of the Secretary, and shall assist the Secretary as need be.

Section 6. The Treasurer shall receive all monies for the Society and deposit them in the name of the Society in such banking institutions as the Executive Council shall direct. He shall pay therefrom by draft or check all bills and obligations of the Society; he shall keep an account of all monetary transactions and shall exhibit a statement of them when called for by the President or the Executive Council, and shall make a full report for the preceding calendar year at the annual meeting.

Section 7. The Assistant Treasurer shall assume the duties of the Treasurer in case of the death, resignation, absence, or disability of the Treasurer, and shall assist the Treasurer as need be.

Section 8. At the expiration of his term of office, each officer shall deliver to his successor all books, papers, funds, and vouchers belonging to the Society.

Section 9. The Society shall not and may not make any dividend, gift, division, or bonus in money to any of its members.

Article VII. MEETINGS

Section 1. The annual meeting shall be held in affiliation with the International Congress of Entomology or the annual meeting of the American Association for the Advancement of Science, or at such other time and place as the Executive Council may determine. Notice of said meeting shall be given as provided in the By-Laws.

Section 2. Special meetings of the Society may be called by the Secretary upon the written request of the President or ten active members. Such request shall state the purpose for which the meeting is to be called and the time and place where it is to be held. No other business, except that specified in the call, shall be transacted, except by unanimous consent of the members present.

Article VIII. PUBLICATION

Section 1. The official periodical of the Society shall be known as "The Lepidopterists' News." Each volume shall be issued for a calendar year, the number of issues to be fixed by the Editors in consultation with the President and Secretary. In it shall be published the proceedings of the annual meetings. A list of the members of the Society shall be issued each year.

Article IX. EDITORIAL BOARD

Section 1. The Editor-in-Chief shall be elected by the Executive Council. The four Associate Editors and the several consultants shall be appointed by the Editor-in-Chief, who shall define their duties. The Editor-in-Chief shall serve for the term of three years, and he may be re-elected.

Section 2. Editorial Board. The publications of the Society shall be under the charge of an Editorial Board, consisting of the Editor-in-Chief, four Associate Editors, and several consultants. One Associate Editor shall act as assistant to the Editor-in-Chief, one shall be in charge of the season summary, one of the review of recent literature, and one of special publications. The consultants shall be chosen to represent fields of study and taxonomic groups.

Section 3. The Editor-in-Chief shall present an annual report, and the accounts of his office shall be examined and reported upon by the Auditing Committee.

Article X. AUDITING COMMITTEE

Section 1. The President shall appoint an Auditing Committee consisting of three members who shall audit the accounts of the Treasurer and the Editor-in-Chief, and render their reports to the Secretary before December 31st.

Article XI. LIBRARIAN

Section 1. The Librarian shall be appointed by the Executive Council. The Librarian shall serve for the term of three years, or until his successor shall have been appointed.

Section 2. The Librarian shall have charge of the library of the Society, and of all books, periodicals, reprints, and historical material received by the Society. He may make all necessary rules and regulations for the use of the library, not otherwise provided for in the Constitution or the By-Laws.

Article XII. AMENDMENTS

Section 1. This Constitution may be altered, amended, or repealed by a two-thirds vote of the members voting by mail ballot. Each proposal for amendment must be signed by not less than five members of the Society and submitted to the Secretary who will promptly transmit it to the Editor-in-Chief. A copy of each proposed amendment shall be published in *The Lepidopterists' News* at least three months before the annual ballot is mailed in November.

Section 2. The By-Laws may be altered, amended, or repealed, by a majority vote of the members voting, at any meeting of the Executive Council or in a mail-canvass of the Council by the Secretary. All changes so validated shall be published in *The Lepidopterists' News.*

BY - LAWS

Article I. DUES

Section 1. Beginning with 1955, the annual dues for Active Members shall be Four Dollars, U.S.A., (U.S.A. $4.00). Active Membership shall include a subscription to *The Lepidopterists' News.*

Section 2. The annual dues for Sustaining Members shall be Ten Dollars, U.S.A. (U.S.A. $10.00). Sustaining Membership shall include a subscription to *The Lepidopterists' News.*

Section 3. Life Members shall pay the sum of Seventy-five Dollars, U.S.A. (U.S.A. $75.00).

Section 4. Honorary Members shall pay no annual dues, but shall receive a subscription to *The Lepidopterists' News* and all other publications of the Society.

Section 5. All dues shall be payable on January 1 of each year, and shall be deemed in arrears on March 1 of that year.

Section 6. *The Lepidopterists' News* shall not be mailed to any member whose dues are in arrears.

Section 7. After 1955 the annual dues shall be waived for the Secretary, the Treasurer, and the Editor-in-Chief while they are in office; they shall continue to receive all publications of the Society.

Article II. MEETINGS

Section 1. Notice of all meetings of the Society shall be published in *The Lepidopterists' News* at least two months in advance thereof.

Section 2. A majority of the members present at an annual meeting, or represented by proxy, shall constitute a quorum for the transaction of business, not otherwise provided for.

NOTICES

Lepidopterists' Society members may use this page free of charge to advertise their offerings and needs in Lepidoptera. The Editors reserve the right to rewrite notices for clarity or to reject unsuitable notices. We cannot guarantee any notices but expect all to be *bona fide.*

For sale or exchange: 150 papered Nearctic butterflies with data, including 46 *Œneis macounii,* some other rarities, some 2nds. $20 or 100 specimens of Nearctic *Erebia,* any species, with data, reasonable number of poor specimens accepted. Paul R. Ehrlich, Dept. of Entomology, University of Kansas, Lawrence, Kansas, U.S.A.

For exchange: moths and butterflies from New Jersey (papered or pinned). Desired: North American and exotic Rhopalocera, Geometridæ, and Saturniidæ. Michael Shulgin, 3324 Perry Ave., Bronx 67, N. Y., U.S.A.

Wish to exchange Formosan Pieridæ and Papilios and California Rhopalocera for U.S. and exotic material. Have many *Euphydryas editha bayensis* to trade or sell at wholesale price. Especially desire species from Colorado, Cuba, Europe, Africa and southern Brazil. If interested, please send offerta lists. Donald L. Baber, 1511 Drake Ave., Burlingame, Calif., U.S.A.

Wanted: a collection cabinet in good condition with glass topped sliding drawers, approx. 22" x 19", and with not more than 12 drawers. Tony Roberts, 3 Blackstone Place, New York 71, N. Y., U.S.A.

Have both ♂♂ and ♀♀ of *Neophasia terlootii* to offer for exchange for any of the following: *Megathymus smithi, Oncocnemis columbia, O. piffardi, Feralia comstocki, Ophideres materna, Composia fidelissima, Thysania zenobia, Hyparpax aurora, Gabara* spp., or eastern *Caripeta* spp. Contact either W. A. Rees, 934 So. McDonnell Ave., Los Angeles 22, Calif., or Mr. R. H. Reid, 4442 Franklin Ave., Los Angeles 27, Calif., U.S.A.

Wish to contact collectors of Europe, Africa, India, and North, Central, and South America. Want esp. Papilionidæ, Nymphalidæ, and Lyænidæ (esp. Theclinæ). Have many butterflies from Japan for exchange. Masaki Nakayama, 1-397, Fujihonmachi, Wakamatsu-city, Fukuoka-pref., Kyushu, JAPAN.

Parnassius and *Papilio* from Asia for sale. 400 specimens, best quality, full data. Dr. H. Wilcke, Kössen/Tyrol, AUSTRIA.

For sale: a quantity of pinned and papered moths from Nova Scotia, mostly Noctuidæ and Geometridæ, offered as several lots at the rate of 2 to 4 cents each. Please write for details. D. C. Ferguson, Nova Scotia Museum of Science, Halifax, N.S., CANADA.

Wish to exchange California butterflies and moths for any other North African moths. Also a limited supply of Colorado Rhopalocera offered. R. H. Leuschner, 2332 Grove St., Berkeley 4, Calif., U.S.A. (after June: 1172 S. Wenonah, Oak Park, Ill., U.S.A.

For sale: W. H. Edwards' *Butterflies of North America* (3 vols.) and S. H. Scudder's *Butterflies of the Eastern U. S.* (3 vols.), in superb condition. Please write Dr. G. W. Rawson, c/o Ciba Pharmaceutical Products, Inc., Summit, N. J., U.S.A.

LIVING MATERIAL

PUPÆ OF *PAPILIO ZELICAON, P. OREGONIA, P. RUDKINI, P. EURYMEDON* URGENTLY NEEDED FOR HYBRIDIZATION STUDIES. Will purchase or exchange specimens, living material, or books. C. L. Remington, Osborn Zoological Lab., Yale University, New Haven 11, Conn., U.S.A.

ADDITIONS TO THE MEMBERSHIP LIST

Brady, Thomas G., 23 N. Catherine Ave., La Grange, Ill., U.S.A.
Buckett, Steve, 148 Belleview Ave., Petaluma, Calif., U.S.A.
Chvála, Milan, Praha 16, Hořejší nábřezí 21, CZECHOSLOVAKIA.
Cope, Vernon M., 6605 Meadowlawn Drive, Houston 23, Texas, U.S.A.
Dicke, Robert J., Dept. of Entomology, University of Wisconsin, Madison, Wis., U.S.A.
Jacobs, S. N. A., 54 Hayes Lane, Bromley, Kent, ENGLAND.
Janzen, Daniel H., Jr., 608 South Russell Ave., Mineapolis, Minn., U.S.A.
Johnson, James H., Bridgenorth (nr. Peterborough), Ontario, CANADA.
Kimura, Michio G., 500th MIG Strategic Branch, APO 613, San Francisco, Calif., U.S.A.
Krivda, Walter, Teacherage, Gillam, Manitoba, CANADA.
Kuwayama, Satoru (Dr.), Hokkaido Agric. Exper. Station, Kotoni, Sapporo, JAPAN.
McAvoy, Thomas F., Jr., Box 834, Marysville, Wash., U.S.A.
McFarland, A. Noel, 9601 Oak Pass Road, Beverly Hills, Calif., U.S.A.
McGill, Ormond, 581 Forest Ave., Palo Alto, Calif., U.S.A.
Momoi, Shigeyuki, 282 Sannotani, Hommoku, Yokohama, JAPAN.
Moore, Sherman, 1512 Longfellow Ave., Detroit 6, Mich., U.S.A.
Owen, Winfred D., 854 Church St., Ventura, Calif., U.S.A.
Spencer, John C., 13040 Evanston St., Los Angeles 49, Calif., U.S.A.
Thaxter, E. Lincoln, 681 Lexington Ave., New York, N. Y.
Tsuruta, Ts. (Dr.), Nerima Ku, Tokyo, JAPAN.
Vásquez G., Leonila (Dra. Miss), Instituto de Biologia, Casa del Lago de Chapultepec, México, D. F., MEXICO.
Wood, D. M., 7 Dale Ave., Toronto, Ont., CANADA.

Each of the nine nominees for 1955 officers of the Society received over 99% of the votes on the 227 ballots received. The new officers are listed in the back cover of the *News*. The constitutional amendments were approved by a vote of 226 to 1, and the amended Constitution and By-laws are published in full in this issue of the *News*.

ERRATA

Vol. 7, p. 113: in upper list of species, *"Ancyloxipha numitor"*, *"Polites verna"*, and *"Atrytone conspicua"* should each be moved down one line to appear opposite "June 7 ....", "July 1 ....", and "July 12 ....", respectively.

Vol. 8, p. 8: a page of manuscript was lost in the MATTONI abstract; the following should be added:

"9. *P. rita* B. & McD.: Arizona, Utah, eastern California.
10. *P. sonorensis* F. & F.: coastal California, Bay Area to Baja California."

Vol. 8, p. 30: in 7th and 8th lines from bottom, "GRACE HERRESOFF SPERRY" should have been "GRACE HERRESHOFF SPERRY".

Vol. 8, p. 133: in 17th line from bottom, "Following length ...." should have been "Forewing length ....".

Vol. 8, p. 147: the LE CHARLES abstract is an accidental mixture from two manuscript abstracts received from Dr. BELLINGER. The correct abstracts will appear in Vol. 9: p. 27.

THE LEPIDOPTERISTS' SOCIETY

1955 OFFICERS

President:	Lauro Travassos (Rio de Janeiro, Brasil)
1st Vice President:	John A. Comstock (Del Mar, Calif., U.S.A.)
Vice President:	Alberto Breyer (Buenos Aires, Argentina)
Vice President:	Pierre E. L. Viette (Paris, France)
Secretary:	John G. Franclemont (Ithaca, N. Y., U.S.A.)
Treasurer:	Sidney A. Hessel (Washington, Conn., U. S. A.)

EXECUTIVE COUNCIL

Term expires Dec. 1955:	Jose Herrera G. (Santiago, Chile) A. E. Brower (Augusta, Maine, U. S. A.)
Term expires Dec. 1956:	Jean Bourgogne (Paris, France) Don B. Stallings (Caldwell, Kansas, U. S. A.)
Term expires Dec. 1957:	E. B. Ford (Oxford, United Kingdom) Nicholas S. Obraztsov (Sea Cliff, N.Y., U.S.A.)

and *ex-officio:* the above officers and the Editor-in-Chief

The object of The Lepidopterists' Society, which was formed in May, 1947, and formally constituted in December, 1950, is "to promote the science of lepidopterology in all its branches, ... to issue a periodical and other publications on Lepidoptera; to facilitate the exchange of specimens and ideas by both the professional worker and the amateur in the field; to secure cooperation in all measures" directed toward these aims (*Constitution,* Art. II). A special goal is to encourage free interchange among the lepidopterists of all countries.

Membership in the Society is open to all persons interested in any aspect of lepidopterology. All members in good standing receive *The Lepidopterists' News.* Institutions may subscribe to the publications but may not become members. Prospective members should send to the Treasurer the full dues for the current year, together with their full name, address, and special lepidopterological interests. All other correspondence concerning membership and general Society business should be addressed to the Secretary. Remittances in dollars should be made payable to: *The Lepidopterists' Society.* There are three paying classes of membership:

Active Members - annual dues $4.00 (U. S. A.)
Sustaining Members - annual dues $10.00 (U. S. A.)
Life Members - single sum $75.00 (U. S. A.).

Each year a list of members of the Society is published in the *News,* with addresses and special interests.

All members are expected to vote for officers when mail ballots are distributed by the Secretary each year.

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The
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MADAGASCAR LEPIDOPTERA
NEW COLLECTORS' SECTION COMMENCES

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10 August 1955

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THE LEPIDOPTERISTS' NEWS

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PRESIDENTIAL ADDRESS TO THE PITTSBURGH MEETING OF THE LEPIDOPTERISTS' SOCIETY

Ladies and Gentlemen; my dear fellow Lepidopterists:

I am extremely happy to be able to address you personally today. Although you did me great honour by selecting me to be your President for this year, I hardly could have hoped to be able to attend this meeting, because my country is so far away. And though large distances are no barrier for making friends and exchanging ideas, nothing surpasses a personal contact. I am very grateful to my Government and to the Entomological Uyttenboogaart-Eliasen Fund that made my trip possible by awarding me a grant.

When Dr. REMINGTON wrote to me for the first time about the Lepidopterists' Society that was very young at that time, as long ago as 1947, I at once became very enthusiastic, and tried to make myself as useful as I could (which was by the way, not easy because Holland is such a small country and the number of its lepidopterists limited). The need for a society dedicated to lepidopterology, and especially of a society with an international scope, was evident. Its quick and prolific growth that still continues clearly proved this. Most of the members are Americans and Canadians, which is natural, owing to the great number of lepidopterists in these countries. Still the amount of members from elsewhere disappoints me a little. I expected an even more unanimous response to our plan from everywhere. The reason for this is without doubt the fact that a great percentage of lepidopterists are interested only in faunistics; they collect or breed, often exclusively, the Lepidoptera of their respective countries.

However, there is not the slightest reason for pessimism. Time is needed for the propagation of our ideas, and besides, two more things. First it is very important to have at least one active member of the Society in every country, who could abstract literature and recruit more members in that country. And second, we must always try to make our literature reviews as complete as possible. Mankind is ambitious, lepidopterists not excepted. As soon as anybody reads a review of his own paper in our *News,* the Society naturally acquires a new interest for him.

Ladies and gentlemen, I am sure that our Society meets a long-felt need. Although still in a juvenile stage, it certainly will continue to grow and will mature. Terrific organizational work has already been done. We possess

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an excellently edited periodical. We can be proud of that and of the people who achieved these results. Especially I wish to bring tribute to the founders of our Society for the international character they gave it, because what we all need most is free exchange of ideas and cultivation of friendship and goodwill, on as wide a scale as possible.

I wish to discuss with you in broad lines the aspects of Microlepidopterology. Although this is, of course, not a special science, and does not basically differ from other branches of the study of Lepidoptera, still it has specific aspects that are worthwhile to consider.

There is no fundamental difference between the so-called "micros" and "macros", because these groups do not represent taxonomic units or "taxa" but are products of an arbitrary separation. However, this separation is instructive, as it has historical origin; to micros are attributed families of Lepidoptera that generally were and still are regarded by many collectors as too tiresome to handle or not showy enough, owing to their small size, and therefore less desirable for cabinets or not worth collecting at all.

The unavoidable but deplorable consequence of this sentiment in former years was that micros were collected so sporadically and incidentally — at least when compared with the masses of macros collected all over the world during the last 150 years — that they still are very insufficiently known, and in the tropical countries are only beginning to be studied properly. And yet, there must be more micros than macros, as we learn from the lists of faunas that are known best, namely those of the West and Central European countries. For example, in Holland occur more than 1100 micros as against 700 macros. I think that in the tropics this ratio will be still more in favour of the micros; the number of their species there is simply astonishing. An exceedingly fertile and almost inexhaustible field for activity awaits lepidopterists there, and it is remarkable that relatively so few are attracted by the study of the tropical Microlepidoptera. It is this study that has occupied me during the past 20 years and that I have now in mind when discussing with you the aspects of Microlepidopterology.

Once the late Professor G. D. HALE CARPENTER remarked to me that microlepidopterists must be courageous people. I doubt very much whether my colleagues and myself deserve this flattery. To master the taxonomy of any group of Lepidoptera one necessarily must acquire as complete a knowledge of the existing literature as possible, but this is much easier with tropical micros, than with many other groups of Lepidoptera, since the literature on them is so scanty. Perhaps the only courage required is for facing the menacingly large number of all those genera and species that await description!

I had the great privilege to collect and to study Microlepidoptera of one of the most interesting tropical faunas in the world, namely, the Malay Archipelago. Illustrious classical naturalists, such as ALFRED RUSSEL WALLACE, FRUHSTORFFER, the SARASIN brothers, MAX WEBER, and many others collected there, and due to their work the remarkable fauna of this region became famous. The geology and the paleontology bear proof of a complicated history of this area that is subject to heavy tectonic forces, being pinched between two continents, having numberless extinct and active volcanos, having been inundated and dried again several times due to the activity of glacial periods. In this region two rich and entirely different faunas meet, *viz.,* the Asiatic and the Australian, in circumstances that at present are optimal for the flourishing of one of the richest faunas in the world. The zoogeography of this region served as the subject of many classical studies. Macrolepidoptera, especially butterflies, were successfully used, *e. g.,* by WALLACE, and later by my lamented friend, the late TOXOPEUS (who was a specialist in the Lycænidæ) and by ZEUNER, who recently wrote an excellent essay on the distribution of the large Papilios.

It was tempting to try to use Microlepidoptera for zoogeographical research, but this aspect of the study of tropical micros has appeared to be less promising thus far. In spite of the fact that micros seem to be well-suited for this research, judging from their being unable to disperse actively over great distances, across seas, straits, and mountain ridges, their distribution cannot, so far, be very well used for zoogeographic purposes in this region, first, because our data on their distribution are too scanty, and second, because the data of former authors appear to be worthless in the light of our present knowledge of taxonomy based upon modern methods. For example, the distribution of many of MEYRICK'S species as recorded by himself does not teach us anything, as fundamental restudy of all his species, using the characters of genitalia, is necessary first. Every time, this rechecking turns out to become a whole revision, extremely interesting without doubt, but also highly time-consuming. With gratitude and respect I think now of the awe-inspiring enterprise of Dr. J. F. GATES CLARKE, of Washington, who spent two years investigating several thousands of MEYRICK'S types at the British Museum. I hope that his work will appear soon; it will be a very great help for every student of the "micros".

Another aspect of tropical Microlepidopterology, their ecology, on the contrary, represents an extremely fertile field, as variations of their life-habits, choice of food, mimicry, symbiosis, etc., present almost an inexhaustible material for study. There are species preying on lac insects, on cicadas, on ants, or even, alternately, on cicadas and ants! Many live in diverse and mostly intriguing modes of symbiosis with ants. The ecology of mining species alone, however rich and interesting in the temperate regions, as we learn from the monumental studies of Professor HERING of Berlin, a member of our Society, seems to be still more diverse and more intriguing in the tropics, as was recorded by the late T. B. FLETCHER from India, and experienced by myself in Java. My friend L. VARI, of Pretoria, is equally enthusiastic about the mining micros in South Africa; they serve as the subject for his thesis which he is preparing at present.

Some tropical Tineidæ (*Monopis*) present a simply baffling biology: they are the only Lepidoptera known that are obligately viviparous (and apparently parthenogenetic), and it even seems likely to me that their eggs must mature and numerous larvæ hatch inside a spacious uterus during pre-adult stages of the mother insect (during the pupal or perhaps the late larval stage?). This subject alone offers a rich field for research not only of biology, but also of anatomy and cytology.

However, perhaps the richest field for study is the taxonomy of tropical Microlepidoptera. I need not go into the already generally recognized conception of taxonomy as the fundamental doctrine bearing the ramifications of other zoological sciences. Taxonomic study necessarily precedes anything else, also here, and is urgently needed to open this field to other branches of research. So rich is the tropical fauna and at the same time so little investigated, that great taxonomic discoveries might easily be expected here, discoveries that might greatly contribute to our conception of the relationships of the whole order Lepidoptera.

My above remark on the lack of data on tropical Microlepidoptera is not quite true, of course, for excellent work has already been done and is being done at the present time. It certainly would be very unfair not to mention the work of the classical authors, and its merits. WALSINGHAM, MEYRICK, SNELLEN, CLEMENS, and many others provided the rough groundwork upon which our system stands. Each of them has done an enormous amount of work, such as is hardly possible for anyone in our day. MEYRICK, for example, must have described during his long life not less than 20,000 new genera and species! It is an extensive base they left us, but their work needs considerable remolding to fit our changed standards.

It is a great consolation that those comparatively few students of Microlepidoptera we possess at present do splendid and outstanding research. Of these modern workers I wish to mention the names of the late AUGUST BUSCK and CARL HEINRICH, who studied the micros of the New World; Professor JANSE of Pretoria, who in spite of his advanced age is preparing monographs of the Heterocera of South Africa, including micros; as I said already, L. VARI is preparing a monograph of leaf-miners of South Africa; I am sure that he soon will present many new facts on their ecology and taxonomy. DR. J. F. GATES CLARKE of Washington, apart from his revision of MEYRICK'S types, carries on with his studies of the Neotropical fauna. Dr. T. N. FREEMAN and ROBERT LAMBERT of Ottawa are preparing revisions of the Canadian Tortricinæ and Sparganothidinæ. Mr. IAN F. B. COMMON of Canberra, Australia, is preparing a thorough revision of the Australian Tortricidæ. Students of the Palearctic micros are somewhat more numerous. I already mentioned the eminent studies of Professor HERING on leaf-miners. My friend Dr. N. S. OBRAZTSOV recently finished an impressive 500-page manuscript on the classification of the Palearctic Tortricidæ and hopes to begin soon with a corresponding monograph on the Nearctic fauna; these studies will be of the greatest importance for further study of this family. Furthermore, I wish to mention two recent studies that impressed me very much, *viz.,* a monograph on the Palearctic Eupistidæ by Dr. S. TOLL (1952) and another on the Palearctic species of *Depressaria* by Dr. H. J. HANNEMANN (1953).

As to myself, I brought together in Leiden extensive materials of South Asiatic micros. I hope to bring their study to some proper end before I die, although I am still chiefly occupied with the first superfamily, the Tortricoidea. I expect that I will meet the same fate as most of us and as my friend Professor ROEPKE of Wageningen, Holland, who says that when he dies he will be short not much more time than a hundred years!

Ladies and gentlemen, I am coming to the end of my rough and superficial sketch of some aspects of the Microlepidopterology. And since I am your President I wish to use my fatherly right and privilege to finish this address with a sermon! I wish to formulate a few suggestions that refer to most important points. Partially they come from my taxonomic creed.

In taxonomy one should never neglect classification of higher taxa (*e. g.*, from superfamiles to tribes) for the classification of lower taxa, as *e. g.*, genera and species. The latter are usually much easier to define than the former, with the result that our taxonomy often is a top-heavy structure, with bulky upper stories upon an inadequate basement.

When describing a taxon one should try to use as many characters as are available. This is almost a platitude; however, there still are taxonomists who neglect this rule. It is also preferable in most cases to give a complete diagnosis of a new taxon, instead of referring to a related taxon, saying; "similar to so and so, only differing by . . . "; such a diagnosis is not practical as it cannot be used independently, without knowing the diagnosis referred to by heart.

When describing a new genus, sketches of the head and of neuration, and in case of a new species, detailed figures of genitalia of both sexes should be added. One never should forget to indicate and label types and paratypes. Finally, taxonomists should be economical with new terms for structures of genitalia, and try to come together to a uniform terminology of these parts.

And herewith I open the meeting in the hope that it will be a great success.

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THE BREEDING IN CAPTIVITY OF THE HYBRID *PAPILIO RUTULUS* FEMALE × *PAPILIO GLAUCUS* MALE

by C. A. CLARKE and P. M. SHEPPARD

Using the technique of hand-pairing (Clarke 1952) it has been found possible to hybridise many members of the *Papilio machaon* group of Swallowtails, and the preliminary results of these crosses have already been reported (Clarke & Sheppard 1953 and in press). It occurred to us that the same technique might give useful information about other groups of Swallowtails, and during 1954 *P. glaucus* was bred in order to investigate the genetics of the dimorphism in the female. The results of this are not yet complete but during the work it was found possible, by hand-pairing, to hybridise *P. rutulus* ♀ with *P. glaucus* ♂ and this seems worth while reporting separately. It is not known whether hybrids between *P. glaucus* Linné and *P. rutulus* Lucas occur in nature but C. L. REMINGTON (personal communication, 1955) states:- "I have seen only two wild-caught specimens which closely resemble your hybrids, and both are from localities near the meeting-line between the ranges of the two species."

For our experiments *P. rutulus* pupæ were obtained from Washington State and those of *P. glaucus* from Chicago, Illinois. Both were kindly supplied through Mr. EUGENE DLUHY.

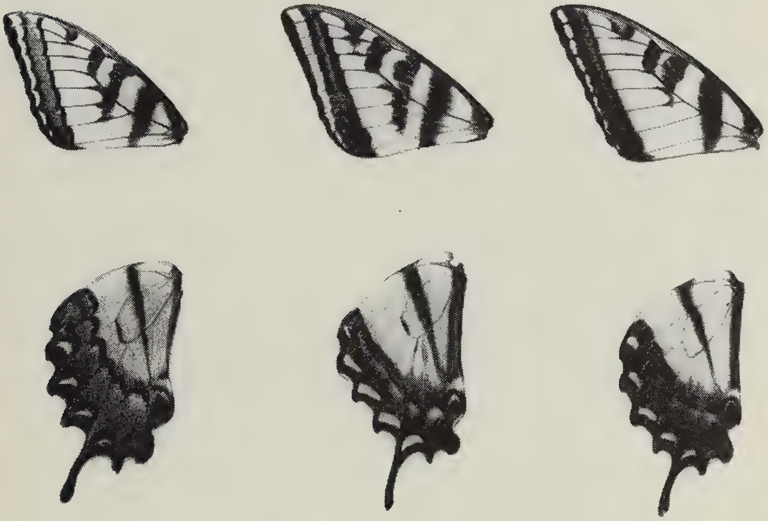
The male and female butterflies were mated (mating 249) on 13 June 1954, both parents having emerged a few days previously. The male had been bred by us from an earlier mating (mating 108, ♀ *glaucus* (yellow form) X ♂ *glaucus*).

The ♀ *P. rutulus* laid readily on *Liriodendron,* and 21 ova were deposited on 15 and 16 June. One of these failed to darken, but all the rest hatched. One larva died, and one was killed accidentally. The surviving hybrid caterpillars appeared to us to resemble those of *P. glaucus,* but it should be pointed out that we have never seen the early stages of *P. rutulus.* The larvæ fed readily on *Liriodendron* and, when supplies were low for a short period, they accepted *Syringa* (lilac). Pupation occurred at the end of July and the butterflies started to emerge on 11 August, three females emerging first. By 9 September all 18 butterflies had come out, 10 ♂ ♂ and 8 ♀ ♀; all of them had a yellow ground colour.

Edwards (1897) stated that the main difference between *P. glaucus* and *P. rutulus* lay in the character of the submarginal border on the underside of the forewings, — separate yellow lunules in *glaucus* and an unbroken yellow band in *rutulus*. Dr. REMINGTON (personal communication, 1955) states that this difference does not hold good for all localities and that it appears that the only character which is consistently clear-cut between the two species is the colour of the most anterior outer spot on the hindwing underside. This is orange in *P. glaucus* and yellow in *P. rutulus.* In addition, in some areas dimorphism in the female (yellow and black forms) is present in *glaucus* but never in *rutulus.*

In the hybrids the colour of the most anterior outer spot on the hindwing underside is yellow streaked with orange — that is intermediate between the two parent forms.

No dimorphism was present in the hybrid females, all being yellow, but it should be noted that their father had been bred from a yellow female and that his single sister was also yellow. Consequently, as the difference between the black and yellow forms of the female is almost certaily controlled by a pair of allelomorphs, it is not at all remarkable that only yellow females were produced.



Left, *P. glaucus;* center, *P. rutulus;* right, F_1 hybrid. Male forewings above, female hindwings below; undersides only. Large orange spot near outer angle of ♀ *glaucus* appears dark in photo.

In the particular *P. glaucus* and *P. rutulus* butterflies which were the parents of our hybrids the character of the sub-marginal border on the underside of the forewings showed very distinctly the differences noted by EDWARDS (see above). In the hybrids this band was intermediate (see photograph).

Fertility

Seven sib matings were obtained by hand-pairing the hybrids. Two females laid two and nine eggs respectively on *Liriodendron,* but all failed to show signs of development. The hybrid females were tested on *Liriodendron, Populus alba, Populus* sp., *Salix caprea,* and *Betula.*

Three backcross matings were obtained (see table).

BROOD NO.	MATING	EGGS LAID	SIGNS OF DEVELOPMENT IN EGGS	OFFSPRING ♂	OFFSPRING ♀	REMARKS
312	♀ 215 (yellow) × ♂ 249 (F_1 hybrid)	49	None	0	0	4 laid on *Populus alba,* remainder on *Liriodendron*
333	♀ 252 (black) × ♂ 249 (F_1 hybrid)	9	None	0	0	
334	♀ 249 (F_1 hybrid) × ♂ 237 (black mother)	13	One none, 12 hatched	5	3	all ♀♀ yellow
				3 still in pupa; one died as larva		

In the 8 backcross butterflies the colour of the most anterior outer spot on the hindwing underside was intermediate (hybrid-like) in 4 butterflies, yellow in 2, and orange in 2.

It is also of interest that the three females which have so far emerged are all yellow, but no deductions as to the genetics of the ground colour can be drawn from such a small number.

The fact that one backcross was fertile, as are many between species in the *P. machaon* group, allows the differences between the forms to be investigated genetically, and these are to be the subject of a further paper.

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A NEW RACE OF *PAPILIO INDRA* FROM THE GRAND CANYON REGION

by DAVID L. BAUER

Until 1950 the occurence of *Papilio indra* Reakirt in Arizona was overlooked by lepidopterists; in that year the "Grand Canyon Natural History Association" published *Bulletin* No. 11, on the butterflies of the Grand Canyon, by JOHN S. GARTH. Under *Papilio indra minori* Cross, Dr. GARTH makes this statement: "The writer is indebted to Lloyd Martin of the Los Angeles Museum for pointing out the similarity of the under wing of this *Papilio* to *indra* rather than to *bairdi.*" This specimen has been examined by the writer; also all other specimens of the *Papilio machaon* group in the Grand Canyon Work Shop collection were studied. This search turned up two more *Papilio indra* specimens of the same type as the first. One of these specimens bore the label "*Papilio polyxenes auterius* Cram.", and was determined as such by J. F. GATES CLARK of the U. S. National Museum. This same specimen is listed as *Papilio ajax* L. by GARTH on page 10 of the above mentioned *Bulletin;* however, he also noted that it appeared to him to be identical with the specimen designated *Papilio indra minori* Cross. This last specimen labeled "*Papilio polyxenes asterius* Cram. female," has proved to be a male of the Grand Canyon race of *Papilio indra.* The other specimen found in the Work Shop collection was taken by Mr. ERNST CHRISTENSEN and was in the *Papilio bairdii* series. The examination of these specimens was made in 1952. The same year the writer captured a large male specimen near Ryan Ranger Station west of Jacob Lake, which at first was mistaken for a female *Papilio bairdii* Edwards. Since then the Park Naturalists at Grand Canyon have taken about forty additional specimens. These specimens have been examined and found to be consistently separable from all previously named species and races of the *Papilio machaon* Linné complex. The description of this previously unnamed race follows:

Papilio indra kaibabensis new subspecies

MALE. Upper suface of primaries: jet black, with a complete submarginal series of pale yellow spots; the post-median series of spots is composed of small, much clouded pale yellow spots; in the male type specimen there are only four such spots, those nearest the inner margin being completely obliterated by black over-scaling.

Upper surface of scondaries: jet black, with an incomplete series of small black-clouded submarginal yellow spots; the spot nearest the costal margin at the outer angle is obsolete as are also the two between the tail and the anal angle, leaving only three small submarginal spots; the row of blue spots is located in the usual position across the wing, and is composed of large, prominent, light blue spots; these spots shade gradually to black outwardly and are more prominent than those found in any othe *machaon*-group *Papilio.* The orange-red spot of the inner angle is largely filled by the central black spot, leaving only a thin cresent of orange; the post-median series of yellow spots is almost entirely obliterated by the black ground; the spot nearest the costal margin is the only one which is consistently present, but is reduced by black scaling to a narrow band; occasionally there is a trace of the next in line from the costal margin and of the yellow spot nearest the anal angle.

Under surface of primaries: black; submarginal series of spots considerably larger, paler, not clouded with black scaling, and six in number; the spots nearest the costal margin and the anal angle tinged with reddish orange; the series of blue spots reduced in area and prominence; the post-median series of pale yellow spots complete, seven in all; the orange-red spot of the inner angle larger and central black spot smaller, resulting in greater prominence of spot.

Palpi black. Antennæ black. Head black, with two yellow spots located dorsally at the posterior edge of each eye. Thorax black, dorsally two orange-yellow lines continuing posteriorly from the yellow spots on the head across the thorax to the base of the inner margin of the primaries. Abdomen black, usually with a small yellowish area on each side just cephalad of the claspers.

Forewing length base to apex of male TYPE 48 mm.; variation of length in type series 45-51 mm. Hindwing length of male TYPE 37 mm.; variation of length in type series 34-39 mm. Tail length of male TYPE 9 mm.; variation in type series 7-10 mm.

FEMALE: Upper surface of primaries: jet black; same markings as male, pale yellow submarginal and post-median spots reduced in size, and in number in post-median series.

Upper surface of secondaries: black; markings same as male.

Under surface of primaries and secondaries same as for male.

Palpi, head, thorax, and abdomen same as in male.

Forewing length of female ALLOTYPE 53 mm.; variation in type series 48-53 mm. Hindwing length of female ALLOTYPE 42 mm.; variation in type series 38-42 mm. Tail length of ALLOTYPE 10 mm.; variation of type series 8.5-10 mm.

As may be noted from the description above, the males and females are almost identical in appearance and most closely resemble female specimens of *Papilio bairdii* or *Papilio polyxenes* Fabricius. The lack of sexual dimorphism is characteristic of this race.

HOLOTYPE male: (expanse 76 mm.) Bright Angel Point, Grand Canyon, Coconino Co., Ariz., August 1953, leg. ERNST CHRISTENSEN.

ALLOTYPE female: (expanse 86 mm.) same locality and collector as HOLOTYPE, 14 August 1953.

PARATYPES: 9 males and 3 females. Data as follows (all but one male from the Grand Canyon National Park): 1 male, North Rim, 3 August 1938, leg. LOUIS SCHELLBACK; 1 male, Yavapai Point, South Rim, 22 August 1944, leg. LOUIS SCHELLBACK; 1 male, Bright Angel Point, North Rim, 13 August 1951, leg. ERNST CHRISTENSEN; 1 male, Bright Angel Point, North Rim, 7 August 1953, leg. ERNST CHRISTENSEN; 1 male, Roaring Springs, North Rim, 4 August 1953, leg. ERNST CHRISTENSEN; 1 male, near Ryan Ranger Station, Kaibab Plateau, Coconino Co., Ariz., 1 July 1952, leg. D. L. BAUER; 1 female, data same as for ALLOTYPE; 1 female, data same as for HOLOTYPE.

The HOLOTYPE and ALLOTYPE and four male PARATYPES will be returned to the Naturalist Work Shop Collection, Grand Canyon National Park; from there I believe the HOLOTYPE and ALLOTYPE will be sent to the U. S. National Museum. One male and one female PARATYPE will be returned to Dr. RODECK and the University of Colorado Collection, one male PARATYPE to the Yale Peabody Museum, and one male PARATYPE to the Los Angeles County Museum. The remainder are in the author's collection.

The type series of *Papilio indra kaibabensis* has been carefully compared with specimens of *P. indra* from northern California, Washington, and Colorado, *P. indra pergamus* from southern California, and P. *indra minori* from Colorado, and with other members of the *Papilio machaon* group. Following is a table of differences for the black Swallowtails of the West.

A. *P. polyxenes asterius* Stoll

This is widespread and the best known species of the group, so it will be used as a basis of comparison.

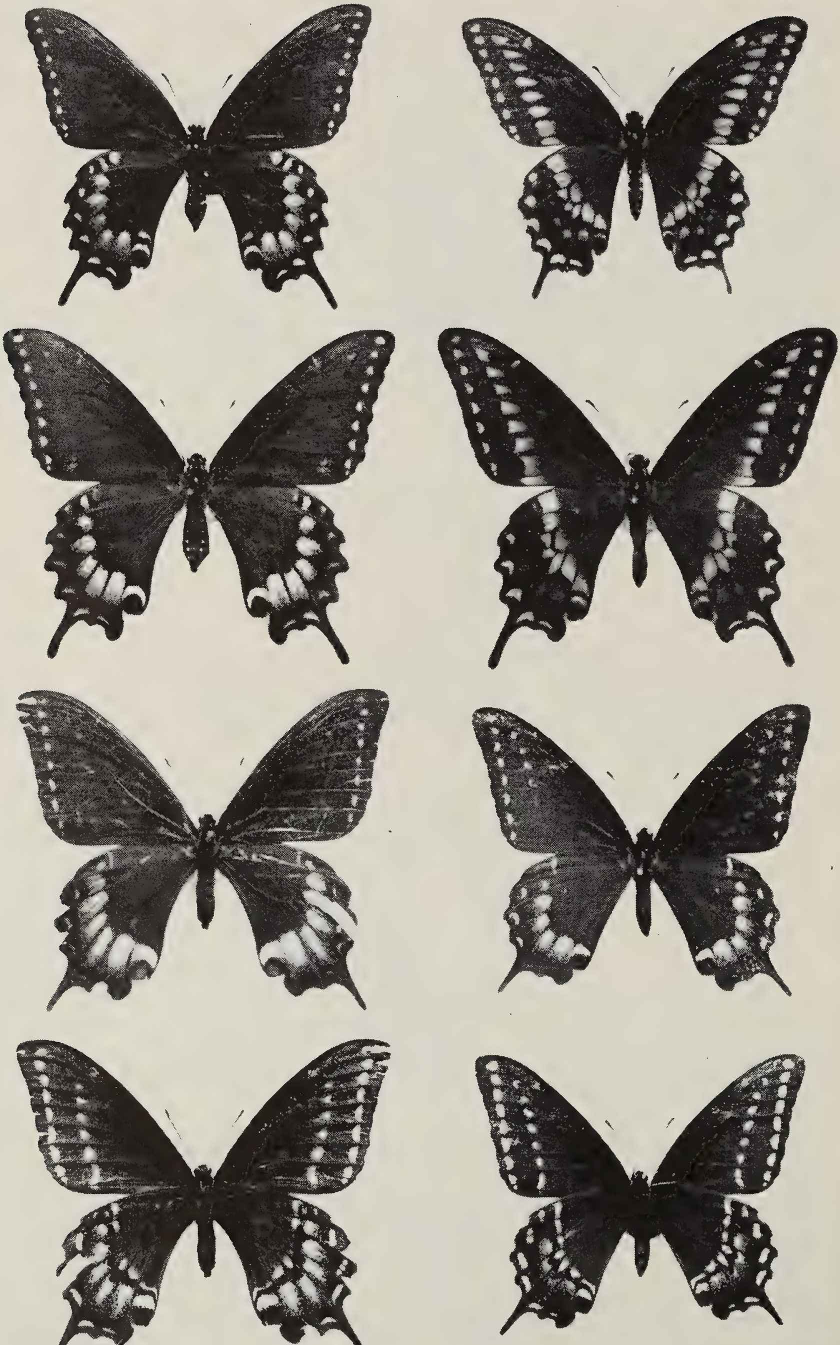
1. Wings: ground color black; pattern of markings shows marked sexual dimorphism and is composed of a complete submarginal series of yellow lunules and a complete series of yellow submedian spots in the male, variably obsolete in female; blue series of spots variable in prominence and number; anal orange spot pupiled with central black dot.
2. Tails long (8 - 10 mm.).
3. Palpi wholly black or partially yellow; antennæ and head black; two dorsal yellow spots posterior of eyes.
4. Thorax: the prothorax with two yellow dorsal spots; remainder of thorax and legs black; lappets or tegulæ black or only faintly yellowish.
5. Abdomen spotted in typical fashion with yellow.
6. Best distinguishing character: orange color of post-median and four submarginal lunules on underside of secondaries.

B. *P. rudkini* form "clarki" Chermock

1. Wings: ground color, pattern, and sexual dimorphism same as *P. polyxenes asterius;* post-median series of yellow spots of secondaries crosses wing differently and is wider near costal margin.
2. Tails long (7 - 10 mm.).
3. Palpi partially yellow; antennæ and head as in *P. polyxenes asterius.*
4. Thorax, legs, and lappets as in *P. polyxenes asterius.*
5. Abdomen spotted as in *P. polyxenes asterius.*
6. Best distinguishing character: smaller size and paler under surface, with considerably less orange in yellow spots.

C. *P. bairdii bairdii* Edwards

1. Wings: ground color and pattern same as in *P. polyxenes asterius;* sexual dimorphism more marked; male submarginal lunules and post-median series of spots normally larger, while in the female they are smaller; blue series of spots variable as in *P. polyxenes asterius;* anal orange spot has elongate black spot reaching to black along inner margin of wing.
2. Tails longer (8.5 - 12.0 mm.).
3. Palpi always yellow, sometimes tinged with black; antennæ black; head with considerable yellow all around the eyes.
4. Thorax: black with prominent yellow spots on prothorax dorsally and at base of forewings ventrally; lappets yellow or tinged with black; legs black.
5. Abdomen: spotted with yellow as in *P. polyxenes asterius,* but very variable, from very small nearly obsolete spots to large confluent spots; claspers black, partially yellow, or entirely yellow.
6. Best distinguishing characters: large size; much larger yellow submarginal and post-median spots on underside and very little orange except in post-median spots at end of cell of secondaries; also nature of anal orange spot and its black dot.



D. *P. indra indra* Reakirt

1. Wings: ground color and wing pattern typical of the group; wings more rounded; yellow spots very pale; post-median series of spots wider, forming a band on secondaries; blue series as in *P. polyxenes asterius* variable in number; anal orange spot and its central black dot as in *P. polyxenes asterius;* no notable sexual dimorphism.
2. Tails very short (1.5 - 4.0 mm.).
3. Palpi black; antennæ black; head black with two orange-yellow spots dorsally, as in *P. polyxenes asterius.*
4. Thorax as in *P. polyxenes asterius* except spots are orange-yellow; lappets pale orange-yellow; legs black.
5. Abdomen: black with one to three lateral yellow spots cephalad of claspers; claspers black.
6. Best distinguishing characters: more rounded wings; paleness of all yellow spots, which form band on secondaries; and very short tails.

E. *P. indra pergamus* Hy. Edwards

1. Wings: ground color and pattern of wing markings as in *P. indra indra,* but wings more angular; no notable sexual dimorphism.
2. Tails rather long (6.0 - 6.5 mm.).
3. Palpi, antennæ, and head as in *P. indra indra.*
4. Thorax as in *P. indra indra.*
5. Abdomen as in *P. indra indra.*
6. Best distinguishing characters: the more angular wings and longer tails separate it from typical *P. indra.*

F. *P. indra minori* Cross

1. Wings: ground color and pattern of wings as in *P. indra indra;* post-median band of spots much narrower and series of blue spots on secondaries more prominent; anal spot and black dot same; no marked sexual dimorphism.
2. Tails rather long (6 - 7 mm.).
3. Palpi, antennæ, and head black; head with the typical dorsal yellow spots.
4. Thorax as in *P. indra indra.*

EXPLANATION OF PLATE

Top: *Papilio polyxenes asterius*: left, *ex larva,* Cottonwood, 3500 ft., Yavapai Co., Ariz., 21 Aug. 1952; right, Sta. Catalina Mts., 3500 ft., Pima Co., Ariz., 17 Sept. 1948.

Second: *Papilio bairdii bairdii*: left, Mingus Mt., 6000 ft., Yavapai Co., Ariz., 18 Aug. 1952, *ex larva;* right, Grand Canyon Nat. Park, Ariz. (in G.C.N.P. collection). 1952.

Third: *Papilio indra kaibabensis,* upperside: allotype and holotype.

Bottom: *Papilio indra kaibabensis,* underside: allotype and holotype.

Females left, males right.

G. *P. indra kaibabensis* Bauer

1. Wings: ground color as *P. indra indra;* post-median band of spots greatly reduced on primaries, usually only partially represented, on the secondaries nearly always obsolete except for the spot nearest the costal margin; series of blue spots on secondaries more prominent than in any other of the black Swallowtails; no strong sexual dimorphism.
2. Tails long (7 - 10 mm.).
3. Palpi, antennæ, and head as in *P. indra minori.*
4. Thorax as in *P. indra minori.*
5. Abdomen as in *P. indra indra.*
6. Best distinguishing character: the very dark males, which closely resemble females of *P. polyxenes* and *P. bairdii.* The females can be separated readily from females of other species by the *indra*-marked abdomens and also other *indra*-type markings. Both males and females can be separated from other *P. indra*-group races by the larger size, longer tails, and darker coloring.

I wish to thank Dr. C. L. REMINGTON for his helpful counsel, Mr. DONALD EFF and Mr. W. C. MINOR for the loan of specimens of *P. indra minori,* and Professors MELVILLE H. HATCH and TREVOR KINCAID of the University of Washington for the photographs presented with this paper.

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RECORDS OF *BOLORIA TODDI* FROM MARYLAND

At higher elevations in the East, *Boloria toddi* (Holland) [=*Brenthis bellona* (Fabricius)] occurs as far south as North Carolina (Klots, 1951) and Tennessee (Clark, 1932). Along the Atlantic Costal Plain, however, the southern limit of this species is recorded as New Jersey (Klots, 1951).

During the past few years, this species has been taken independently by the writer and by J. H. FALES at several localities in eastern Maryland. These include Harford Co. (Bel Air, writer), Howard Co. (Dayton, writer), Prince Georges Co. (Beltsville, J. H. FALES; College Park, writer) and Montgomery Co. (Silver Spring, writer).

AUSTIN CLARK (Clark, 1932) mentioned the possible occurrence of *B. toddi* near Washington, D. C., although in spite of extensive collecting, he was unsuccessful in taking it in this area. In view of this, the records from Beltsville, College Park, and Silver Spring are especially interesting, as these locales are quite close to Washington, D. C., and are areas which were searched by Mr. CLARK. The recent occurrence of *B. toddi* in these areas may indicate a southward extension of the range of this butterfly subsequent to Mr. CLARK'S recording of its absence in 1932.

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DISTRIBUTION OF THE MOTH EAR MITE (*MYRMONYSSUS PHALÆNODECTES*)

by ASHER E. TREAT

For the three years since its discovery in Tyringham, Massachusetts, the gamasine mite *Myrmonyssus phalænodectes* Treat, a parasite in the tympanic organs of noctuid moths, has been known only from the type locality and from Bergen County, New Jersey. The wide variety of hosts, however, and the high incidence of infestation in some species made it seem probable that the mite was more widely distributed, and that it could be found in museum collections of Lepidoptera. Through the kindness of Dr. F. H. RINDGE of the American Museum of Natural History, Dr. J. G. FRANCLEMONT and Dr. W. T. M. FORBES of Cornell University, and Dr. E. L. TODD of the United States National Museum, permission was obtained to examine the specimens of *Pseudaletia, Leucania,* and related genera in those institutions. This paper presents evidence that the range of the mite is nearly worldwide.

The description of the mite, together with notes on its biology and ecology, has recently appeared elsewhere (Treat, 1954). Among known parasites of adult Lepidoptera, *M. phalænodectes* is unusual if not unique in that at least during the warmer parts of the year it lays its eggs and completes its life cycle entirely upon or within the body of its host. It has thus far been reported only from adult noctuid moths, chiefly those of the genera named above, though several others are occasionally infested. Colonies of the mites develop unilaterally in the tympanic air sac and associated cavities, destroying the auditory function of these parts but sparing the corresponding structures of the opposite side. Since the tympanic organs are generally acknowledged to be at least partly auditory in character (Schaller & Timm, 1950; Treat, in press), it seems appropriate to use the name Moth Ear Mite for this parasite, despite the obvious lack of homology between the tympanic organ and a vertebrate ear. The usage may gain some authority from the opinion of Imms (1947) that "These [tympanic] organs may with some justice be regarded as ears."

Evidence of infestation is easily detected even in pinned specimens, provided that the wings have been properly spread and that the legs do not conceal the external tympanic recess. If the mite colony was moderately or well advanced when the moth was captured, slight displacement of the setæ with a fine needle under the binocular microscope will usually reveal either the mites or their eggs. The dried mites are yellowish brown and much flattened. To the casual glance they might be mistaken for dermestid feces. The eggs, when dry, are shrivelled and yellowish. They are usually attached to the conjunctiva ("accessory" or "false" tympanal membrane of Richards, 1933, and other authors), which may also be pitted and discolored by older egg scars. Although the eggs are not distinctive as compared with those of other mites of similar size, their presence together with rupture or perforation of the tympanic membrane may be taken as tentatively diagnostic for the Moth Ear Mite. If the pinned specimen can be dissected to the extent of removal of the first abdominal tergite on the side of the suspected infestation, the mites can usually be found in the tympanic air sac or countertympanic cavity. Mites and eggs, either fresh or dried, may be mounted directly in Hoyer's medium (Baker & Wharton, 1952). They can be cleared and relaxed by gentle heating of the slide after the coverslip has been placed.

The table includes records from all of the chief biogeographical regions, obtained from the study of specimens chiefly of *Leucania* and related genera in the three collections mentioned above. In the American Museum, Nearctic as well as exotic material was examined. In the other two collections, only exotic forms were studied, and in the U. S. National Museum the investigation was limited to Palearctic, African, Oriental, and Hawaiian specimens. Host names are given as they appear in the various collections. The scarcity of Palearctic records may perhaps be explained by the comparatively small amount of material available for study.

Seasonal distribution follows the expected pattern, with the highest incidence for the temperate regions of both northern and southern hemispheres in midsummer, and with scattered records in the tropics throughout the year. In northeastern New Jersey, infested moths have been taken as early as June 9 and as late as October 23. The winter quarters of the mite remain to be discovered. The present data increase the number of recorded host species from 23 to 48.

Records of *Myrmonyssus phalænodectes* from Specimens Chiefly of *Leucania* and Related Genera in the American Museum of Natural History [AMNH], Cornell University [CU], and the United States National Museum [USNM].

Locality	Date	Host Species
NEARCTIC		
Rangeley, Me.	24 Aug. 1949	*Pseudaletia unipuncta* Haw. [AMNH]
Cohasset, Mass.	19 July	*Leucania i. insueta* Gn. [AMNH]
Cohasset, Mass.	3 Sept.	*Scotogramma t. trifolii* Rott. [AMNH]
Dorchester, Mass.	10 July 1901	*Leucania commoides* Gn. [AMNH]
New Windsor, N.Y.	9 July 1891	*L. pseudargyria* Gn. [AMNH]*
New Rochelle, N.Y.	24 Aug. 1949	*Pseudaletia unipuncta* Haw. [AMNH]
Mendham, N.J.	20 Aug. 1935	*L. phragmatidicola* Gn. [AMNH]*
Mendham, N.J.	29 Aug. 1952	*L. multilinea* Wlk. [AMNH]*
Dumont, N.J.	23 Oct. 1954	*Sunira bicolorago* Gn. [author's coll.]
Chester, N.J.	17 Aug.	*L. multilinea* Wlk. [AMNH]
Newark, N.J.		*L. extincta flabilis* Grt. [AMNH]
Pennsylvania		*L. pseudargyria* Gn. [AMNH]
Washington, D.C.	16 Aug. 1882	*L. scirpicola* Gn. [AMNH]
Iowa City, Iowa	4 Aug. 1898	*L. phragmatidicola* Gn. [AMNH]
Volga, S.Dak.		*Aletia o. oxygala* Grt. [AMNH]
Ft. William, Ont.	15 Aug. 1953	*A. oxygala luteopallens* Smith [AMNH]
near Hattiesburg, Miss.	1-11 Oct. 1944	*L. e. extincta* Gn. [AMNH]
New Orleans, La.	4 Oct. 1951	*L. linita* Gn. [AMNH]

Locality	Date	Host Species
Lake Okechobee, Fla.	30 April 1912	*Leucania* sp. (undet.) [AMNH]
Harris County, Texas		*Leucania* sp. (undet.) [AMNH]
near Forestburg, Texas	24 Sept. 1950	*L. phragmatidicola* Gn. [AMNH]
Wichita Falls, Texas	7 Oct. 1950	*L. phragmatidicola* Gn. [AMNH]
Minnehaha, Yavapai Co., Ariz.	4 Oct.	*L. imperfecta* Smith [AMNH]
Malibu, Calif.	10 Aug. 1941	*L. oaxacana* Schaus [AMNH]
Rancho La Sierra, Riverside Co., Calif.	23 Sept. 1940	*L. oaxacana* Schaus [AMNH]
Berkeley, Calif.	3 Sept. 1941	*L. oregona* Smith [AMNH]
San Mateo, Calif.	14 Sept. 1941	*L. oregona* Smith [AMNH]
NEOTROPICAL		
Jalapa, Mexico		*Pseudaletia sequax* Francl. [AMNH]
Punta Prieta, Baja Cal., Mexico	27 March 1935	*Tricholea e. edwardsi* Smith [AMNH]
El Volcano, Chiriqui, Panama	3 March 1936	*P. unipuncta antica* Wlk. [AMNH]
Jamaica, Br. W. Indies	1953	*P. sequax* Francl. [AMNH]
Cabanas, Cuba	5-8 Sept. 1913	*P. sequax* Francl. [AMNH]
Moengo, Surinam	17 May 1927	*Cirphis humidicola* Gn. [CU]
Pelotas, Brazil	27 Aug. 1951	*P. sequax* Francl. [CU]
La Estanzuela, Uruguay	Jan. 1953	*P. adultera* Schaus [CU]†
La Estanzuela, Uruguay	7 Jan. 1953	*Cirphis* (=*Faronta*) *albilinea* Hübner [CU]
ETHIOPIAN		
Umtali, Southern Rhod.		*Borolia micropis* Hampson [CU]*
Umtali, Southern Rhod.		*Borolia torrentium* Gn. [CU]*
ORIENTAL		
Tjibodas, Mt. Gede, Java	15 Aug.	*Cirphis lasiomera* Hampson [USNM]
Mt. Makiling, Luzon, P.I.		*Borolia aspersa* Snell [USNM]
Arisan, Formosa	3 June 1932	*Cirphis albicosta* Moore [CU]
Suisha, Formosa	1 June 1934	*C. albicosta* Moore [CU]
PALEARCTIC		
Yachow, China		*Cirphis sinuosa* Moore [USNM]*
near Mupin, China		*Leucania* sp. (undet.) [USNM]
AUSTRALASIAN		
Ninay Valley, Dutch New Guinea	Nov. 1908 to Jan. 1909	*Cirphis leucosphenia* Bethune-Baker [CU]
Victoria, Australia		*Pseudaletia australis* Francl. [AMNH]
OCEANIC		
Kauai, Hawaii	May	*Cirphis amblycasis* Meyr. [USNM]

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*Diagnosis of *Myrmonyssus phalænodectes* made from eggs and host damage only.

†Incidence of infestation 54 percent (82 out of 152 specimens).

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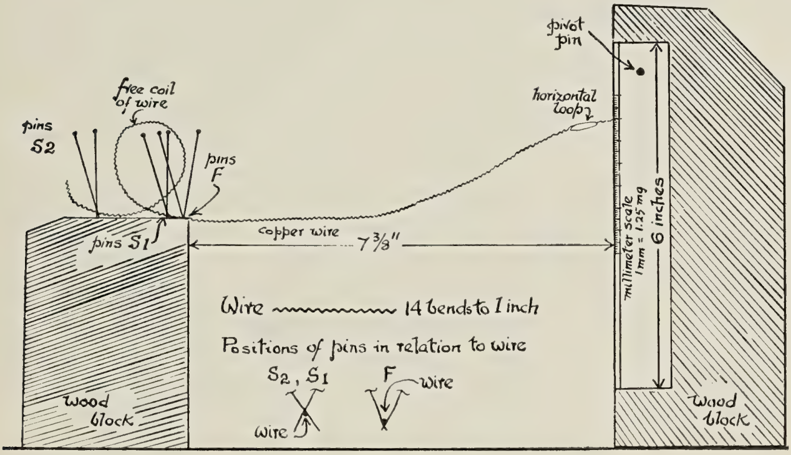
AN APPARATUS FOR WEIGHING SMALL INSECTS

by P. H. H. GRAY

The writer recently presented (1953) a short article pointing out the existence of correlations between the wing-radii and the weights of certain butterflies. Since weighing small butterflies such as *Pieris rapæ* L. on a beam balance is tedious, the apparatus described below was devised whereby each insect can be weighed in a few seconds. The apparatus is shown diagrammatically in the figure, at the scale of ½ inch to 1 inch.

Two separate wooden blocks form the framework of the apparatus; they are free to be moved for slight adjustments in distance or angle. A length of wire was removed from copper window-screening. The wire is about 15 inches long, half of it forming the balance wire and the remainder being coiled in a loop behind the fulcrum point shown on the left-hand block in the diagram. At the free end the wire was twisted through a right-angle and coiled in a small loop, as in the first stage of making a simple knot. The loop is about one-half of an inch is diameter, with the ultimate two or three bends serving as the pointer.

The fixed end of the wire, on the left-hand block, owes its stability to the manner in which the two pairs of pins, F and S-1 are placed, as shown at full scale in the sketch below the section of wire, also at full scale. The wire rests on the V-shaped fulcrum made by the pins F, which enter the wood below the wire, and is held down firmly by the pins S-1, about one quarter of an inch back from F. The free loop is prevented from twisting or springing by the pins S-2, which are fixed in the same way as the pins S-1.



The scale is a millimeter rule, 6 inches long, held on the right-hand block by a pivot-pin near the top; this pin allows the scale to be moved to the right or left in an arc to adjust the millimeter marks to coincide with the end of the pointer when in the "rest" position.

The utility and accuracy of the balance were tested by means of gram-weight fractions of analytical standard. The wire was adjusted in length from F so that 1 millimeter on the scale was equivalent to 1.25 milligram; further extension did not improve its capacity or relative value. It was at this point in the development of the apparatus that the pins were put firmly into their permanent positions. In order to make the tests a small piece of thin paper was placed on the horizontal loop at the front (pointer) end to receive the weights. Here is an example of the tests:

Weight fraction	*Pointer depressed*
One 10 milligram	8 millimeters
Two 10 ”	16 ”
One 20 ”	16 ”
One 20, one 10 mgm.	24 ”
One 50 milligram	40 ”

The same results were obtained on checking again during and after weighing about 150 *P. rapæ.*

When the pointer reaches its maximum depression, which should not, on this first model, exceed 60 millimeters, it fluctuates only slightly, and the weight can be read to the nearest 0.3 mm., or about 0.4 mgm. Reweighing the same insect several times brings the pointer down to the same position each time, and recovery is to the same starting point.

The following example should be of interest:

A dry specimen of *P. rapæ* was found to weigh 21.25 mgm. The two forewings were removed, and the weight was found to be 17.50 mgm. The two forewings were then placed on the balance; they depressed the pointer 3 mm., equivalent to 3.75 mgm. It is thus possible to weigh objects having a mass of less than 4 mgm.

A valid criticism of the reliability of the device can be made because the weighed butterflies were not also weighed on a real balance of acceptable accuracy. This may be adequately covered by the fact that gram fractions were used as checks. However, four *Pieris rapæ* which gave certain values in 1952, shortly after drying in the basement, were weighed again on the wire device and by means of a Mettler Gram-atic Balance. The present weights are a little lower than the former, probably because of the butterflies having dried a little more in the warmth from the house furnace. Other comparisons have been given elsewhere (Gray, 1954). Figures are milligrams.

	August 1952 *Wire*	*March 1953* *Wire*	*March 1953* *Gram-atic*
1	20.0	18.7	18.2
5	16.3	15.6	15.6
10	20.6	19.3	19.3
13	17.5	16.3	16.7

The advantages of such a device are as follows: (1) it takes only a few seconds to weigh one specimen; (2) it appears to be reliable within the limits of 75 to 5 mgm.; (3) the cost is considerably less than that of a torsion balance of similar capacity.

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NOTES ON THE LEPIDOPTEROFAUNA OF MADAGASCAR

by PIERRE E. L. VIETTE

The island of Madagascar is situated between 12° and 25° South latitude and separated from the East African coast by the Mozambique Channel: 3,000 meters deep, 390 kilometers wide at the minimum. The surface is 585,000 square kilometers (one kilometer equals nearly five-eighths of a mile).

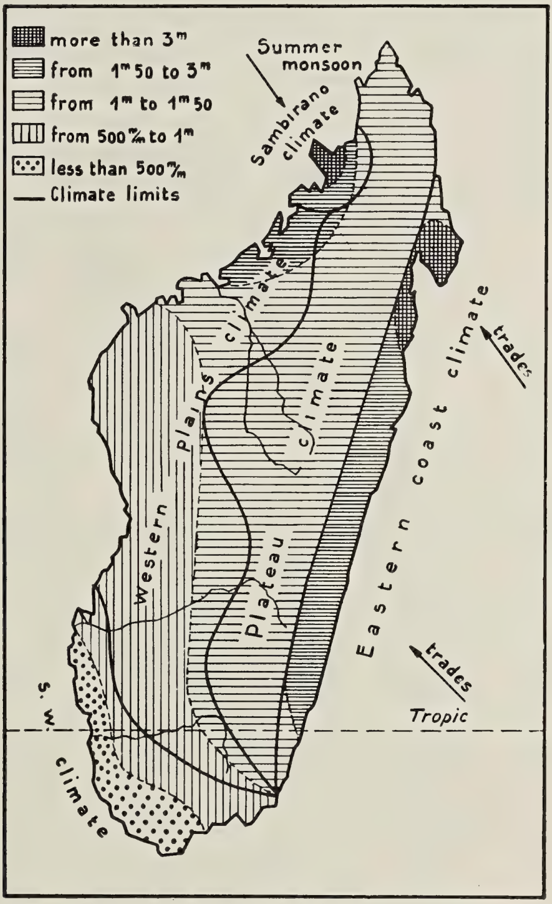

Fig. 1. Map of climates and rainfall on Madagascar.

Three-fourths of Madagascar is formed by a crystalline highland (gneiss and mica schists) surmounted by volcanic uplifts (Tsaratanana Mts., highest part of the island, alt. 2,884 m in the north; Ankaratra Mts., alt. 2,644 m in the center), while in the east and the west are plains having a very different aspect. The eastern plains, along the west of the Indian Ocean, are completely alluvial; the western plains, of sedimentary origin, show the series of formations from the Trias, on the primary base, to the Tertiary and the Quaternary toward the Mozambique coast.

Because of the high altitude in the higher part of the island, the proximity to the Equator and, in the south, the presence of the Tropic of Capricorn, Madagascar has various different climates, determined in part by the system of the winds. Towards the Indian Ocean, the rivers are numerous and short with a torrential aspect, except in the coastal part. Towards the Mozambique Channel, the rivers are longer, often large, and less rapid.

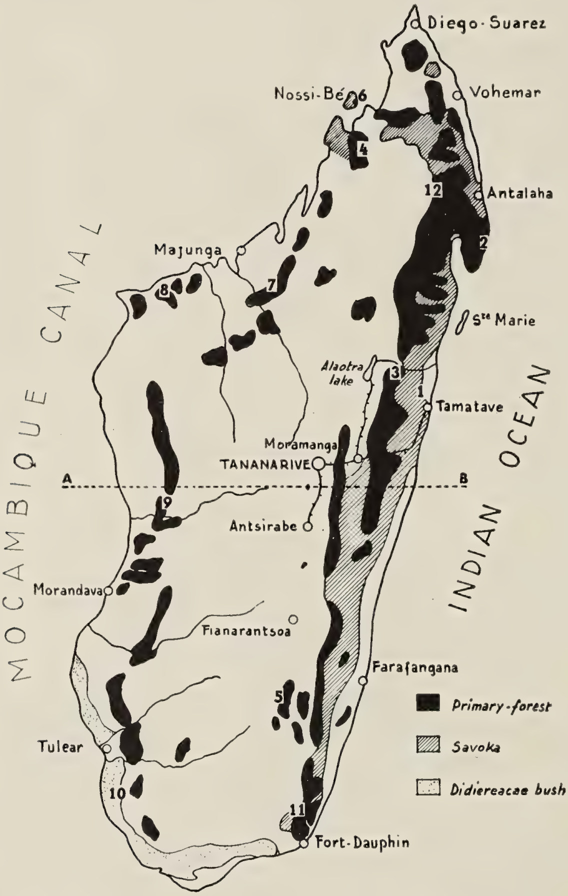

Fig. 2. Map of the distribution of forests on Madagascar. The "Savoka" is a secondary growth in the eastern zones. The numbers indicate the sites of the Integral Natural Reserves.

The vegetation of the island was exclusively a forest vegetation. From a very general point of view three plant formations are to be considered:

1.) The East and the Center formations are made by a rain forest, much more important than was indicated by RICHARDS (1952:12), show different aspects according to the altitude:

a) The eastern area is the only one to have a continuous forest zone, in some parts very narrow, on the slopes toward the wet trade winds. There are trees 10 to 20 m (30 to 65 feet) high with a very dense undershrub, of tree-ferns, *Pandanus,* orchids, and epiphytic plants. It rains all the year round, but the wettest season is during the summer: November to April.

b) The central area has now unfortunately only a few remnants of forests (the Eastern part of the Ankaratra Mts., Ambositra forest, etc.); there are generally denuded hills with reddish ravines in the laterite rocks; in the depressions or valleys are the rice plantations. The wet season is also during the summer, with fogs during the winter.

2.) The western formation is dry during a large part of the year with, in summer, a short but very rainy wet season. It shows some vestiges of forests with deciduous leaves, very different of the eastern and central forests.

3.) The subdesert far-Southern zone with the very strange bush of Euphorbiaceæ and Didiereaceæ, unique in the world.

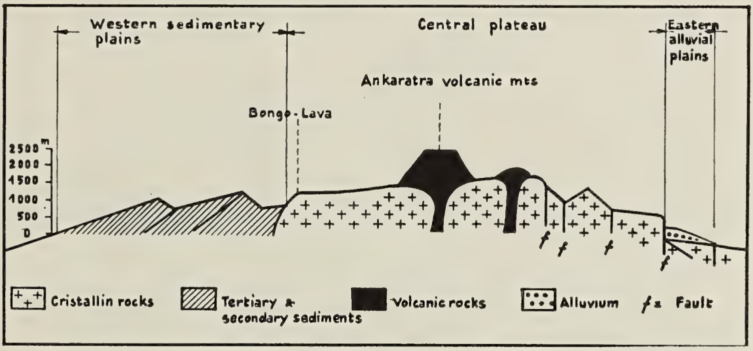

Fig. 3. Geological profile of Madagascar through the A-B line shown on figure 2.

Unfortunately these botanical formations were very much injured by the natives and their custom of burning the bush. Now only one-tenth of the general surface of the island has a primary vegetation, and the fauna is very restricted and local. For the protection of the remaining flora and fauna, France has made, since 1932, twelve Integral Natural Reserves in the different parts of the plant zones. The size of these different Reserves is very variable, 20 to 15,000 square kilometers, but it is strictly forbidden to enter such a Reserve (differing from a National Park), except with a special authorization for some scientific investigations. The flora and the fauna there are absolutely free.

About the Lepidoptera, the first general study was published by Dr. J. B. A. DECHAUFFOUR DE BOISDUVAL (1833). This study is generally known as a little book with the title *Faune entomologique de Madagascar, Bourbon et Maurice. Lépidoptères.* In fact, the original publication is in *Nouvelles*

Annales du Museum (Paris), 1833, vol. 2: pp. 149-270. The second general study is M. SAALMÜLLER'S: *Lepidopteren von Madagascar,* of which the first part was published in 1884 and the second, finished by L. VON HEYDEN, in 1891.

Between these two studies, of BOISDUVAL and SAALMÜLLER, a great number of original descriptions were published in different countries and periodicals, chiefly in France and England, and SAALMÜLLER, at the beginning of his book, had the merit to make a complete bibliography of the whole of the studies or papers published, up to his time, on the Madagascan Lepidoptera.

After SAALMÜLLER, the most important papers, with descriptions, were those of P. MABILLE (the original locality of these is generally unknown), CH. OBERTHÜR (from the collecting of MELOU, and PERROT brothers, and LAMBERTON), and G. KENRICK (from the material collected by F. B. PRATT). Between the two World Wars, the most important papers are those of L. B. PROUT (for the Geometridæ) and C. L. COLLENETTE (for the Lymantriidæ) from the material of the Tring Museum, collected and sold by MELOU and by N. and G. OLSOUFIEFF. Among the other collectors, it is important to cite the names of G. WATERLOT, A. SEYRIG, R. DECARY, and R. CATALA.

The classic views maintain generally that the fauna of Madagascar is very rich in Oriental affinities. After my first mission in Madagascar, during the austral summer 1951-1952, a small group of French specialists, in close relation with the "Institut de Recherches scientifiques de Madagascar," in Tananarive, was organized in the National Museum, Paris, to study with the collaboration of foreign specialists, if it is necessary, the Lepidopterofauna of the island. The results confirm entirely the more general views published by R. PAULIAN (1952) on the Madagascan insect fauna, and the classic older views must be completely modified or, at least, suffer some restrictions. If it is right that the endemic Lepidopterofauna is, with the still unlisted species, a rich fauna, it is no less true that this fauna is purely sylvan, limited now to the forest areas still existing. It is in these very restricted domains of the true native vegetation that the true Malgassican Lepidopterofauna must be studied.

As regards the number of individuals of any one species, it must be understood that this will depend upon the forest area. With the exception of the scrub on the burned areas, the rest of the forests are mostly on small patches in the bottom of valleys; the area is being reduced each year, and the fauna is disappearing there. These remnants of forest are very far from each other and effectively separated by regions devoid of animal life. Outside of the zones with a true Madagascan fauna, the zones cultivated by man have a great number of introduced species, as in the vicinity of Tananarive.

If, as I have said above, the species still to be listed are numerous, it is completely otherwise concerning the importance and the number of families. The richness in species of the catalogues of the fauna of Madagascar hides, in reality, the relative poorness of the fauna. This fact, clearly true of the Lepidoptera, has been noted in other groups by J. MILLOT (1952) and R. PAULIAN (1952). Certain genera of Microlepidoptera, Geometridæ, Arctiidæ (Lithosiinæ), Lymantriidæ, and Satyridæ have reached an enormous development with a tremendous subdivision into endemic species and even sometimes of endemic genera, with African affinities or unrecognizable because of profound modifications. On the other hand, other important families are very little represented; we can cite Lycænidæ with 42 species against more than 1,200 on the African continent and Hesperiidæ with 49 species against more than 450. It is also true for the Notodontidæ, Saturniidæ, Pieridæ (see, for this family, the excellent revision of the subfamily Pierinæ by G. BERNARDI, 1954). The Pyralidæ, that generally elsewhere form an important mass of the nocturnal Lepidopterofauna, are only moderately abundant in Madagascar; the species are endemic, African, or scattered in every warm zone of the Old World. Many species injurious to crops belonging to this family are present in Madagascar. Eupterotidæ have just been discovered, with one species. Metarbelidæ, rather abundant on the Continent, are represented by only one genus and one species. Hapialidæ are unknown. Even if many species are still to be discovered and to be described in numerous families, the future discoveries, as compared with the importance of collecting during the past fifty years (R. Paulian, 1954), will not change the conclusions given here.

The origin of the Madagascar Lepidopterofauna is African. Many common species, extensively scattered in every warm zone of the Old World, were described in 1833 from Madagascar and the Mascarene Islands by BOISDUVAL and then rediscovered in India some ten years after, when the African fauna was still almost unknown. This was one of original causes of the error, that made biogeographers consider the Madagascar Lepidopterofauna an Indian fauna. If one refers to the numbers given below taken amongst the Rhopalocera, which are the best known, one will easily see that Madagascar has a fauna with an African origin. In the Papilionidæ, the endemics are all closely related to African groups; only one genus and one species, both endemics, have an indiscernable position. Among the 31 species of Pieridæ, a dozen endemics have Ethiopian affinities, the other species are all African, with the one exception of the imported genus *Catopsilia,* which has an Asiatic origin. Among the Lycænidæ, 24 endemic species are closely allied to the African species, several being even single strays; no genus is entirely Madagascan; 12 species are the same in Madagascar and in continental Africa; and 3 species have a vast geographical distribution in the Old World. In the Nymphalidæ, the genus *Precis* is excusively Madagascan and Ethiopian. Among the Hesperiidæ, of 49 species, 31 are endemic and found in 8 endemic genera, with Ethiopian affinities, 18 species are also found in continental Africa. The majority of the Sphingidæ are African species or belong to African genera. The same is true for the Geometridæ where, because of the multitude of the species, there exist a certain number of endemic genera.

To end these few generalities, a little will be said about some spectacular species well known to lepidopterists.

Chrysiridia madagascariensis Less. (Uraniidæ) is a species of the eastern rain forest and flies during the day. This species emerges at the middle of the rainy season, and migrations to the central highlands sometimes occur. The foodplant of the larvæ is *Omphalea biglandulosa* Back — one of the Euphorbiaceæ found strictly in the forest. The species, except in migration, does not exist in the central highlands. R. CATALA, (1940) using variations of temperature, has obtained a great number of varieties, one specimen being almost entirely black.

Argema mittrei Guen. (Saturniidæ) is found in the eastern rain forest and some remnants of forests in the highlands (Ambositra, Isalo, etc.). It appears between September and April. The larvæ, polyphagous (R. Catala, 1937: 69), were found on one Mimoseæ, Myrtaceæ (*Eugenia*), and Cunoniaceæ (*Weinmannia*).

Pharmacophagus antenor Drury (Papilionidæ) is the largest of the diurnal Lepidoptera in Madagascar. It appears during almost the whole year in the western and southern areas. The larvæ feed on one Combretaceæ: *Quisqualis grandidieri* H. Baill.

The genus *Charaxes* (Nymphalidæ) presents beautiful species in the eastern rain forest.

Other species, less well-known and not very common in collections, are also interesting to signalize: *Hübneria dux* Saalm., a large Catocalinæ; *Epicausis smithi* Mab., with a long red anal tuft; the genus *Miniophyllodes* (Noctuidæ); the genus *Isorropus,* with red and black species (Arctiidæ); and *Pemphigostola synemonistis* Strand, with an uncertain systematical position.

If it is a fact that the Lepidopterofauna of Madagascar has an African origin, how can it be explained? This comes within a more difficult and more general study, and it is necessary to use hypothetical reasoning. Moreover, the Lepidoptera are, from the point of view of biogeography, poor material. One of the last proposed hypotheses is that of Professor MILLOT (1952), who considers that Madagascar has been populated by natural islets that drifted from the main African rivers and landed along the island of Madagascar with their flora and fauna, the island acting as an empty place.

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DANAUS GILIPPUS IN MISSISSIPPI

by BRYANT MATHER

The remark by Mrs. HOPF (1954) that she had supposed that *Danaus berenice* was confined to the southern part of Florida, around the Everglades, suggests the desirability of recording its occurrence on the Gulf Coast of Mississippi. The fact of such occurrence is not noted in either of the published lists (Weed, 1894, and Hutchins, 1933), and has been mentioned only once, incorrectly, in the literature. CHERMOCK (1950) includes *Danaus berenice* as one of five species listed by HUTCHINS but not seen by MATHER in Mississippi until that year. This is incorrect since the species was not listed by HUTCHINS and was not seen by MATHER until 1953.

Eight Mississippi records are known. They are:

Date	Locality	Record by	Present Location
189?	Ocean Springs	H. E. Weed	Miss. State College
1910	Biloxi	F. M. Jones	not known
Aug. 1916	Long Beach	W. J. Frederich	Miss. State Coll.
Sept. 1916	Gulfport	C. C. Greer	Miss. State Coll.
18 Aug. 1940	Gulfport	H. I. O'Byrne	Univ. Missouri
12 May 1952	Moss Point	L. Harris, Jr.	Sight record
8 Aug. 1953	Biloxi	Bryant Mather	Sight record
9 Aug. 1953	Gulfport	Bryant Mather	Mather Collection

Ocean Springs and Moss Point are in Jackson County; the other localities are in Harrison County. All of these localities are in the southern parts of the counties bordering the Gulf of Mexico in what has been designated as the "Gulf Strip" by KLOTS (1951), who gives the range of *D. gilippus* as "s. Georgia, Florida, Gulf Strip, Mississippi Valley..."

It was collected once by JUNG (1950) on 9 November 1937 in a swamp in the eastern part of Orleans Parish, Louisiana. I have a male that I picked up dead on 6 October 1950 beside U.S. Highway 11 near Slidell, St. Tammany Parish, La., 11 miles from the Mississippi State line.

The Mississippi and Louisiana specimens before me correspond with the figures and descriptions of *Danaus gilippus berenice* Cramer given by KLOTS (1951), HOLLAND (1947), and CLARK (1941) as does another specimen, ex coll. LUCIEN HARRIS, JR., taken at Coleraine Plantation, Folkston, Georgia, 28 May 1950. Other specimens taken by me at Houston, Harris Co., Texas, 28 October 1953, and at Tucson, Pima Co., Arizona, 26 October 1954, correspond with *Danaus gilippus strigosus* Bates. HARRIS (1950) reports that he took specimens of *D. strigosus* at St. Simon Island, Georgia and that EUSTIS reported it from Augusta, Ga. GROSSBECK (1917) reported that HEBARD had recorded *D. strigosus* from Miami, Florida, (28 Jan. — 8 Feb.) but regards it as "doubtful whether this record really refers to *strigosus*."

I note that in the series of five males and three females before me, the males are all noticeably larger than the females, as indicated below, where "mm." is the forewing length in millimeters.

Males

subsp.	date	State	mm.
berenice	9 Aug.	Miss.	45
"	6 Oct.	La.	46
strigosus	26 Oct.	Ariz.	44
"	"	"	40
"	"	"	41
		Average	43

Females

subsp.	date	State	mm.
berenice	28 May	Ga.	35
strigosus	28 Oct.	Tex.	38
"	26 Oct.	Ariz.	36
		Average	36

KLOTS (1951) gives the expanse as 3.1 — 3.3 in. The approximate average thorax width of the specimens before me is 3 mm. KLOTS' values therefore convert to forewing lengths of 38 — 40 mm. My specimens suggest a forewing-length range of at least 35 — 46 mm, with a range of 40 — 46 mm. for males and 35 — 38 mm. for females. In any case, both the values given by KLOTS and those derived from measurements of these specimens indicate that both subspecies of *Danaus gilippus* include specimens with forewings less than 40 mm. long. This would appear to invalidate the primary criterion given in the key presented by CLARK (1941) for separating *D. gilippus* and *D. jamaicensis* Bates. CLARK however notes that "certain pale specimens of *D. gilippus strigosus* from Mexico approach *D. jamaicensis* so very closely as to suggest that *jamaicensis* should be considered as a subspecies of *gilippus* rather than as a distinct species." The possibility of a relation between the specimen of *D. jamaicensis* from Florida referred to by CLARK and the records of *D. gilippus strigosus* from Georgia and Florida by HARRIS (1950) and GROSSBECK (1917) is suggested.

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FLIGHTLESS FEMALES OF *ACENTROPUS NIVEUS* REARED FROM MASSACHUSETTS PROGENITORS

by ASHER E. TREAT

The occurrence in 1953 of *Acentropus niveus* (Olivier) in Tyringham, Massachusetts, remote from its normally aquatic habitat, was related previously in this journal (Treat, 1954). The insects then captured included both males and fully winged females. The flightless form of the female, long studied in Europe, has not, to my knowledge, been found on this side of the Atlantic, nor has the rearing of these moths been reported in this country. The early stages have been described from European materials only. The present writing records the repeated occurrence of *Acentropus* in large numbers during 1954, and the rearing of flightless females from their eggs. Observations bearing upon the mode of respiration are also included. The extensive European literature is well summarized by Berg (1941).

From June 11 to 18, and from July 12 to September 4, 1954, a nightly watch for *Acentropus* was maintained at the lighted station in Tyringham where the moths had previously been captured. The records given in the Table indicate that in Massachusetts the winged females are by no means rare, as they are reported to be in Europe, and that in contrast to most European experience, they may be taken early as well as late in the summer. It is also evident from the Table that the occurrence of the winged females is not contingent upon dry weather, as had been suspected from their appearance during the previous summer toward the end of a prolonged drought.

The behavior of the insects at light was as previously described (1954), and was not appreciably different when a 15-watt "black light" fluorescent tube was substituted for a standard 150-watt incandescent bulb with photoflood reflector. The moths were found fluttering or resting at the ground surface, where they gathered in every depression and could be collected with fingers or forceps. Only twice was a moth seen in mid-air, even while hundreds were fluttering in the grass, and on these occasions the observed period of free flight was only momentary. Systematic search of the known ponds, streams, and bogs within a mile of the regular collecting station failed to reveal the breeding place of the insects. The problems of where they came from and how they reached the light remained unsolved.

Eggs were collected for rearing on July 20, and on August 24 and 25. Ovipositing females were placed in water containing some floating fragments of a moss which the larvæ later rejected as food. The moths remained at the water surface, depositing their eggs in mats upon the scales of the slightly submerged plants or in double rows along the stalks. Occasionally a female would creep below the surface by clinging to a partly submerged stem. It appeared impossible for them to submerge themselves by other means. While under water, such specimens were more or less ensheathed, with folded wings, in a

Appearances of *Acentropus niveus* at light in Tyringham, Massachusetts, between 1 June and 4 September, 1954.

Date	Time	♂♂ Taken	Winged ♀♀ Taken	Remarks
15 June	12:15 AM	21	1	Temp. 15° C. Dense fog. Many more seen than taken; many were carried off by ants.
20 July	10:15 PM	34	20	Temp. about 18° C., preceding thunder showers.
21 July	12:00 M	1		
22 July	11 PM	5		Temp. 14.5° C. Clear, after light rain.
23 July	9 PM	2		
	12 M	1		
24 July	9:45 PM	1		Other species abundant at "black" light.
28 July	10-12 PM	12	7	Two were seen in flight a foot or two above the ground. Weather cool and very damp.
18 Aug.		2		
19 Aug.	10:30 PM	1		After rain. Moth responded with leg movements to ultrasonic vibrations at 50 to 100 kcps.
23 Aug.	11 PM	7	3	Temp. 15° C. Clear. Southwesterly breeze.
24 Aug.	9 PM	69	8	Temp. 20° C. Light rain.
25 Aug.	9 PM	36	45	At Coleman lamp about 300 feet southwest of Four Brooks Pond, Tyringham, 1 mile north of regular collecting station. Temp. about 20° C.; calm. Two males seen at edge of pond; others at nearby lights.

silvery envelope of air which buoyed them quickly to the surface whenever their foothold on the plant was released. Eggs were also collected from females ovipositing in dry, open watch glasses; these were then transferred to water, where they developed normally. None of the moths survived for more then 18 hours after capture. Specimens of embryos and of subsequent stages were collected in alcohol at measured intervals.

In the attic laboratory the eggs hatched within 8 to 9 days. BERG and others have reported hatching periods varying from 12 to 31 days. At least 12 hours before the emergence of the larvæ, their silvery (and hence presumably gas-filled) tracheal trunks could be seen through the transparent egg cuticle. Since the plant genera described as the common food of *Acentropus* in Europe (*Elodea, Ceratophyllum,* and *Potamogeton*) were not found locally, the larvæ were offered such aquatic plants as could be collected. The only one accepted was *Elatine americana* (Pursh) Arn., the Waterwort or Mud Purslane. This minute, delicate, broad-leaved weed grew sparsely in Four Brooks Pond at depths varying from a few inches to about 4 feet, the uppermost leaves either floating or shallowly submerged. No evidence of attack by *Acentropus* was seen in any of the plants when collected. The later batches of larvæ were offered *Elodea* and *Ceratophyllum* obtained from a New York dealer, in addition to the locally collected aquatics. They showed a distinct preference for *Ceratophyllum,* readily leaving the other plants to tunnel in its tubular stems and leaves. Both *Elatine* and *Ceratophyllum* (but not *Elodea*) were used by the larvæ in building typical nests or "houses" such as those described by BERG.

Details of appearance, behavior, and development in all stages followed closely those described and illustrated by Berg (1941) and by Ritsema (1878). The larvæ showed a rather surprising tolerance of conditions unfavorable to many fresh water animals. Feeding was observed, at varying rates, in water ranging from 10° to 22° C. Prolonged exposure to temperatures between 24° and 26° C. appeared to be lethal. One month-old larva, isolated in its nest during late August, was still vigorously responsive to stimulation after more than four weeks at room temperature without food. During this time all other life in the small culture dish, with the possible exception of bacteria, had disappeared. Several other larvæ, after less prolonged starvation, recovered promptly when supplied with food.

On September 7 the cultures were transported from Massachusetts to Dumont, New Jersey, and from then on were kept in large glass jars, still at room temperature. The jars contained a deteriorating growth of *Ceratophyllum* in tap water turbid with microörganisms and populated also with snails, oligochætes, ostracods, and some surface-dwelling aphids of undertermined species. Larvæ were occasionally seen to creep out of the water and to wander briefly on the wet sides of the jars. In two instances they made cocoons under the lid of a jar, where they soon dried up and died. The survival rate in the culture started on August 25, though not measured with exactness, was reasonably high. Dead larvæ and pupæ were found rarely. As of January 18, 1955, this culture had produced 6 adults, and still contained 2 living pupæ and 11 larvæ in various stages. The other two cultures were not carried through, but were used to obtain preserved or experimental material.

The adults which have emerged thus far include 5 vestigially winged females and 1 normal male, all from eggs laid on August 25. The first adult, a female, was found dead at the surface of the water on December 22, 1954. Nearby was an empty cocoon containing pupal exuviæ with normal (*i. e.,* not shrivelled) wing cases. The moth was fully developed except for the wings, which were short, flat, and truncated as though torn or broken. The abdomen was filled with eggs. The second adult, also from a pupa with normal wing cases, appeared on December 26 and lived for about 13 hours after it was discovered. It laid 6 eggs, which failed to develop. Its wings were somewhat longer than those of the first female; they were slightly curled or twisted, and were tapered at the tips. They extended to about the middle of the second abdominal segment when folded against the body. The fore wings were white beneath, and were marked above with longitudinal bands of sooty grey. The hind wings were white. Similar females appeared on the 1st and 3rd of January, 1955.

At 9:15 A. M. on January 10, a normal male and a vestigially winged female were found, a few inches apart, at the water surface, where they remained for several hours. Copulation was not observed, but may have occurred before the moths were discovered. When first seen, and for more than 10 hours thereafter, this female was engaged in behavior exactly conforming to BERG'S description of oviposition in his flightless females. With the middle legs extended and beating rhythmically, the body was curved ventrally around a stem of the floating food plant against which the genitalia, just beneath the water surface, were continually rubbed. No eggs were laid, however, and upon dissection the ovaries were found to be rudimentary and devoid of recognizable eggs. The abdomen, though distended in appearance, was occupied chiefly by a large air space. No other abnormalities were noted. The "Tympanalkessel" showed the expected reduction in size as compared with that of the winged female (Treat, 1954), measuring 369 microns in its greatest dimension. The other females possessed mature eggs, and in some instances dropped a few of these, singly, in the water. At no time, however, did they exhibit the characteristic ovipositing attitude or behavior, but rather remained at the water surface with their abdomens elevated as though awaiting the male. These observations are of interest as indicating that the ovipositing reaction is not necessarily contingent upon the presence of mature eggs in the reproductive tract. They also show that the reduction in size of the wings and tympanic organs is not a direct consequence of the growth of the ovaries. Heitmann (1934) has reached a similar conclusion with reference to other Lepidoptera in which wings and tympanic organs show a parallel reduction in the females.

Because of the suggestion of Thorpe (1950) that the flightless females of *Acentropus niveus* employ "plastron respiration" while under water, special attention was given to the wettability of the body surfaces. Only the legs appeared to be consistently hydrophilic. For the first few hours after emergence, the upper parts of the body floated high and dry, as though coated with wax. This water repellancy seemed somewhat diminished with the passage of time. During most of the adult life — never more than 36 hours — the 3 pairs of large, round spiracles on the 2nd to 4th abdominal segments were above the water surface and were evidently open to the atmosphere. The anterior part of the abdomen was somewhat inflated ventrolaterally, and there were irregular compressional movements as of breathing. While in air, the spiracles were surrounded by rings of erect scales. Under water, these scales were depressed as though by the external fluid pressure, in such a way as to cover the spiracular openings. Upon re-emergence into air, the scales could be seen to spring into the erect position, leaving the spiracular orifice free. The moths seemed unable to submerge themselves or to remain under water when forcibly submerged, except when in contact with submerged vegetation, or when, during the last few hours of life, the water repellancy had been partially lost. When the moths were held under the surface by a soft brush, irregular air masses could be seen clinging to the body, chiefly at the abdominal intersegments and about the region where the wings adhered to the body. These air masses did not appear to be held in place by special scales or setæ, nor did they bear any consistent positional relation to the spiracles. Although these observations do not appear to favor the suggestion of plastron respiration in the flightless females, they do not exclude the possibility that the insects may employ this process under more natural conditions than those of the laboratory.

BERG has demonstrated that the larval spiracles of *Acentropus* are covered by a thin cuticular film. The pupal spiracles of at least the 2nd to 4th abdominal segments are open, however, and the cocoons normally contain gas bubbles believed to be derived from the plants to which they are attached. BERG states that if this gas is released, and the cocoons are allowed to fill with water, the pupæ soon die. In conformity with this experience, it was found that gas-free cocoons usually contained dead pupæ. On January 18, however, 2 male pupæ were removed from damaged and gas-free cocoons too far deteriorated to have supplied significant quantities of exygen for several days previously. At least one of these pupæ was alive and capable of movement. The abdominal tracheal trunks were visible as silvery tubes beneath the cuticula in both specimens. When transferred to a covered watch glass, in air, the living pupa died within a few hours, and both became deeply shrunken as though by desiccation. It may thus be questioned whether some cuticular respiration is not possible in the pupal as well as in the larval stage.

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NOTES ON METHODS OF COLLECTING INDO-AUSTRALIAN LEPIDOPTERA

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During my stay in Atchin, Sumatra's most northern province, I was often surprized to receive many specimens of the so-called "fast-flyers" in such fresh and perfect condition that I could hardly believe they had been taken by net. After having asked my native collectors how they managed to get such wonderful results, they showed me one day when I accompanied them. Species moving so fast that you can hardly follow them with the eye are taken by . . . the forceps!

They chose a bright, sandy, and very sunny spot on the river bank, just where the small stream left the forest, and we all urinated on the spot. After about one hour, at 11 A.M., we returned to find the whole place covered with thirsty Lepidoptera of all kinds, mostly *Graphium doson, G. sarpedon, G. agamemnon, Appias nero, Lamproptera curius* and *meges,* a few *Euplœa, Papilio paradoxa, Papilio delessertii,* some *Charaxes,* and many other species. Quietly and slowly we moved on until we reached some big stones and sat there, our forceps in hand, and to my great surprize not one butterfly moved away. Moving our forceps from behind we were able to take more than sixty of the most perfect ones in only about fifteen minutes!

During a fortnight holiday I accompanied my native collectors every day and had many surprizes. We visited places where the night before they had put out a lot of rotten fruit, mostly paw-paw, bananas, and mangoes. There we got many fine specimens belonging to the genera *Amathusia, Faunis, Thaumantis,* as well as many *Adolias* and *Euthalia.*

One day they took me along a small river, and after having crossed it to the other side, we came around a sharp curve, and I could hardly believe I was seeing what they showed me. It was a long climbing stem or root, hanging from a tree at least 25 meters high and nearly touching the water. A faint odor of fermentation, like sweet beer, hung around, and I soon discovered that this smell was from a thick brown liquid secreted by the overhanging stem. The whole length of that stem was literally covered by all kinds of the most wonderful Lepidoptera, and Coleoptera as well; there was not a single inch of space uncovered. Most of the Lepidoptera were the very large *Amathuxidia aurelia,* many *Zeuxidia* species, *Faunis,* the big Satyrid *Neorina,* lots of *Euthalia durhya, Tænecia,* and even several specimens of the most wonderful Nymphalid of the Orient: *Prothoe calydonia,* and even the smaller species, *P. franckii,* in large numbers. I regretted very much not having my camera with me, for I knew that such opportunities are very rarely met. The next day the smell of the liquid had already vanished, and although many Lepidoptera were seen and caught, it was the end. Most of the Lepidoptera we got by the forceps, here as well, so this was the best and richest collecting-day I ever had. Many of the species are not common; most are spread over a wide area, and they are met in single specimens only.

But even species, like the ones met during the sunny hours of the day visiting flowers, have their own habits which one has to know if one looks for good collecting results. I mean here, for instance, the *Aristolochia-Papilios.* The best spots to get these species in numbers are the forest-borders, especially where there are flowering shrubs as the common *Lantana.* From my native collectors I learned that these species do not like to visit flowers in hot sunshine. On the contrary, the best days for collecting them are cloudy and even rainy days when the sun does not show herself at all. When the day starts bright, the best hours are between 6 and 8 a.m. but not later. They disappear into the shadows of the heavy forest to reappear again at about 5 o'clock in the afternoon. But when it rains or the weather is misty and wet, species like *Troides brookeana, T. amphrysus, T. cuneifer, T. miranda, T. helena, Papilio erebus, P. coön delianus, P. aristolochiæ antiphus, P. neptunus,* and *P. sycorax* are seen in numbers flying slowly around the *Latana* flowers and are easily taken with the net. Even inhabitants of the darkest places in the woods, such as *Elymnias,* fly around on such days.

But, it is not always that easy to collect in Sumatra! Unfortunately, it happens that for weeks and weeks there are no Lepidoptera at all on the wing, even when the weather is very favorable and there are many flowers. In 1952 I had my fortnight holiday in February, hoping to collect good things, but during that period of 15 days, my 2 regular collectors and I took exactly 12 specimens worth keeping. Nothing else was seen, even the most common ones being absent. Now I had already remarked the same event in Gedong Biara, in Eastern Atchin, where 2 species of *Papilio* were very common, *P. coön delianus* and *T. brookeana.* Their foodplants, a kind of *Aristolochia* with thick leaves for *T. brookeana* and a low-growing *Apama tomentosa* for *P. coön delianus,* were very common in an old rubber plantation, so I could easily breed hundreds of these species in my garden and had plenty of opportunity to make all kinds of interesting observations. But I was soon surprised to find that after those months the adults of these species were very rare or even absent. Their larvæ were absent as well; I know for sure that even no young larvæ nor eggs were present for months. And then suddenly they reappeared in numbers, apparently from nowhere. We even established a weekly check system in the young forest, where all the foodplants of *T. brookeana* were scoured and the old leaves and stems pruned. We noticed that no *Troides* were flying, there were no traces of their larvæ. In such periods, even the most common *Euplœa, Eurema* or Lycænids are totally absent; you can walk in the forest for hours and see no sign of any Lepidoptera.

Of course a lot of interesting observations can be made; it is much more interesting to know about their life than to just collect what you see. For instance, my collectors showed me how to find the foodplants of many species whose larvæ are unknown, just by following the very old females in search of their foodplants. Other strong fliers like *Charaxes* are taken with fresh excrements, especially those of mongooses, small skunks, tigers, or humans. When approaching carefully a feeding *Charaxes* it is easy to get it by the forceps; otherwise it would certainly damage itself in the net. The bigger species, like *Charaxes dephis,* a most wonderful silver white and yellow one, may become "tame" and may be carried away sitting quietly on one's hand. The border of the big mangrove forests along the muddy coast is the place to collect *Delias aglaia goda,* and the big danaid, *Idea leuconoe,* sometimes sitting in numbers on the flowers of *Lantana,* but only in rainy weather. As soon as the sun comes out, it is impossible to get them, as they hide in the swampy forest where it is impossible to follow them in the mud. All this is to prove that just penetrating somewhere into the forest hoping to collect interesting things because the weather is fine, may be a very disappointing experience, when not knowing the right season and the habits of the species.

127 Malakkastraat, The Hague, NETHERLANDS

THE SOUTHWESTERN RESEARCH STATION OF THE AMERICAN MUSEUM OF NATURAL HISTORY

The American Museum of Natural History has announced the establishment of The Southwestern Research Station. It is located on the eastern slope of the Chiricahua Mountains, near Portal, Cochise County, in southeastern Arizona. The property is within the limits of the Coronado National Forest at an elevation of 5400 feet.

The station was established for the purpose of making available research facilities for scientists and students in all branches of science, who have problems that can be investigated through the utilization of the faunal, floral and geological features of the area. It will be open during the entire year.

It is operated by the American Museum of Natural History, Central Park West at 79th Street, New York 24, New York and under the direction of Dr. MONT A. CAZIER, Chairman and Curator of the Department of Insects and Spiders, to whom all inquiries should be addressed. Anyone interested in the station should write to the above named individual for the booklet which gives the details of the operation and a general description of the area.

ESPECIALLY FOR FIELD COLLECTORS

(Under the supervision of JAMES R. MERRITT)

HOW MANY BUTTERFLY SPECIES IN ONE DAY?

Local checklists have been published of the Lepidoptera of very small regions of the world, and from these we can compare the number of species of butterflies of all Lepidoptera which live in various places. There is, on the other hand, very little to be found on the maximum number of species flying in a small area at the same time. In the vicinity of New Haven my collector-friends and I have made a point of choosing the one day most likely to have the maximum number of butterfly species on the wing and going out for the record on that date.

We have kept detailed notes on the flight periods of Connecticut butterflies for six years, and these have been summarized in the annual Season summaries published in the *News.* We scanned our records and found that July 14th is the one day when we are likely to get the largest number of species. This is a time when many late spring species are battered but have not yet disappeared, and the early summer ones are just emerging.

The first record was taken when my father, P. S. REMINGTON, was visiting us in North Haven at the magic date, and we were, modestly, certain that two Remington nets would give a good accounting of the butterfly fauna. The evening of the 13th we made up lists of species to be expected at our several favorite localities around New Haven. These pocket lists reminded us to make a special point of scouring the respective spots for inconspicuous species we might normally pass by. Starting at 9:00 A.M., we successively visited fields around home in North Haven, then to a wooded hilltop known as West Rock, a pondside marsh and an old alfalfa field in Woodbridge, roadsides and field near the Ansonia flying field, the vicinity of the Osborn Laboratory at Yale, and finally after supper back to West Rock in the evening for the day-end nymphalids. The day was sunny and hot, and we had some success. The 38 species found were, in approximate order:

Phyciodes tharos
Thorybes bathyllus
Megisto eurytus
Cercyonis alope
Strymon acadica
Everes comyntas
Papilio glaucus
Epargyreus clarus
Vanessa virginiensis
Limenitis astyanax
Asterocampa clyton
Strymon falacer
Strymon edwardsii
Strymon titus
Strymon liparops
Papilio troilus
Danaus plexippus
Pieris rapæ
Vanessa atalanta
Mitoura gryneus
Strymon melinus
Pholisora catullus
Erynnis horatius
Lethe eurydice
Speyeria cybele
Speyeria idalia
Boloria toddi
Lycæna hypophleas

Limenitis archippus
Colias philodice
Poanes massasoit
Polites verna
Atrytone logan
Atrytone ruricola
Atrytone conspicua
Colias eurytheme
Ancyloxipha numitor
Vanessa cardui

In addition, we took larvæ of *Papilio polyxenes, Asterocampa celtis, Melitæa harrisii,* and *Erynnis baptisiæ.* Our luck was frustrating in some cases, in which we failed to find normally expected species. For example, our next visit to West Rock, on 19 July, produced *A. celtis, P. polyxenes, Nymphalis antiopa, Polites manataaqua, Achalarus lyciades,* and *Erynnis lucilius,* all of which were probably present there on the 14th.

Two years later, again on 14 July 1954, S. A. HESSEL, R. W. PEASE, JR., and I made the first attempt to beat the record. We visited the same localities, except that a sphagnum bog in Bethany was substituted for the Osborn Lab. vicinity. We had another fine day and with the help in North Haven from my 6-year-old son ERIC, we three found 45 species flying. There were 30 of the 1952 species, 15 new ones, and 8 1952 species did not appear (*T. bathyllus, E. horatius, P. catullus, A. logan, P. massasoit, V. cardui, A. clyton,* and *M. gryneus*). The new records were:

Achalarus lyciades
Thorybes pylades
Polites manataaqua
Polites themistocles
Polites verna
Eurema lisa
Speyeria aphrodite
Boloria selene
Euphydryas phæton
Phyciodes nycteis
Polygonia interrogationis
Nymphalis antiopa
Asterocampa celtis
Lycæna epixanthe
Lycænopsis pseudargiolus

Probably four other species were seen, but not closely enough for certainty: *T. bathyllus, A. clyton, Polygonia comma,* and *Feniseca tarquinius.* We took larvæ of *P. catullus, E. baptisiæ, M. harrisii, A. clyton,* and *F. tarquinius.*

Here, then, is our record. In a state not generally considered "rich" in Lepidoptera, on two attempts on 14 July we found 53 different species of butterflies flying, plus larvæ of 4 more. If everything went perfectly, we could expect a maximum of 65 species on one day. The two most distant localities are less than 12 miles apart, by airline. We challenge collectors in any part of the world to beat our records, confident, of course, that many will succeed and in making the attempt will produce useful information on the relative richness of different regions. Similar comparisons of moth groups would be equally interesting.

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[This will be a regular section of the *News.* Collectors are urged to send notes and suggestions to J. R. Merritt, School of Law, Univ. of Louisville, Louisville 8, Ky., U.S.A.]

FIELD NOTES

SEXUAL DIMORPHISM IN LEPIDOPTEROUS LARVÆ

With reference to the last paragraph of ALICE L. HOPF'S short paper (1954, *Lepid. News* 8: 124), sex can be determined in quite a number of Lepidopterous larvæ.

In many thin-skinned and lightly pigmented larvæ (good examples can be found among the Pieridæ and Hesperiidæ), the male gonads can be plainly seen through the skin of the dorsum.

In the Lymantriidæ, many species have an extra larval instar in the female, and the full grown larvæ of the females can be easily recognized by their greater size. Strangely enough, the Lasiocampidæ do not seem to have this extra instar, although the female imago is often very much larger than the male.

I imagine, however, that the query really refers to differences in colour or pattern. I have recently come across one such case. The African lymantriid, *Dasychira georgiana* Fawc., is, I believe, unique in exhibiting a sex-controlled larval form. The larva is dimorphic; it may be black with black dorsal tufts or green with yellow ones, and there is a sex-controlled female form with a broad orange-red lateral stripe. An account of the genetics of this sex-controlled mutant can be found in *The Entomologist* 85: 88; 1952.

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MASS FLIGHT OF OCOLA SKIPPERS

Although the stimuli responsible for inducing mass flights of insects (migratory or otherwise) remain a mystery, the occurrence of such flights continues to be of interest to biologists generally. Despite the lack of acceptable hypotheses concerning non-migratory mass flights, each notable one should be recorded in the hope that cumulative data will be of use in a solution to the problem.

It is with this thought that the writer (no lepidopterist) records a mass flight of *Panoquina ocola* (Edwards), a common southern skipper. At about 3:00 p.m., on October 15, 1950, the writer and ELSIE W. SMITH, a graduate student, encountered thousands of *P. ocola* flying NNE over Pointe aux Herbes, Orleans Parish, Louisiana, on the southeastern shore of Lake Pontchartrain. The skippers were flying rapidly at from four to twenty-five feet above the surface (land or water) across a mild (11 m.p.h.) east wind, temperature about 80°F. The skippers were first seen on the U.S. 11 highway bridge over the lake about a mile north of the shore and were abundant for about one-quarter of a mile inland. No estimate of the width of the flight could be made. At the end of the bridge it was necessary to drive off the highway to clean the car's windshield which was by then covered with squashed skippers. A few specimens were picked up at the edge of the road from the "windrow" of skippers which had been killed by other passing automobiles.

This species is widespread in southern Louisiana, but neither JUNG (1950) nor LAMBREMONT (1954) recorded *P. ocola* from Orleans Parish, and nothing has been recorded of the habitat of the immature stages. The geographic origin of the flight, of course, remains unknown, but it seems pertinent that for nearly fifteen miles to the ESE, in line with the flight, the area is covered by fresh-water marshes and swamps.

Specimens were identified by Dr. RALPH L. CHERMOCK of the University of Alabama, and are deposited in the Tulane collections (no. 2220).

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GEORGE HENRY PENN, Tulane University, New Orleans 18, La., U.S.A.

RAPID DEATH OF NETTED BUTTERFLIES

Leptotes perkinsæ, indigenous to Jamaica, B. W. I., is easily distinguished from *Leptotes cassius theonus* by the fact that it has but one spot on each secondary. The two spots that *L. cassius theonus* has are considerably smaller. These species differ on the underside also. *L. cassius theonus* is quite common and the sexes are about equally divided. *L. perkinsæ,* on the other hand, is local and rare. Females are missing from most collections. The insect flies mostly at altitudes from 500 to 1800 feet and is extremely active.

There is a spot on Stony Hill back of Kingston where it has been taken, so I went there at 9:15 A.M. on Feb. 5, 1955. At 10:40 the first one put in an appearance. At 11:12 I caught a well-conditioned male and decided on an experiment. I left it alive in my white nylon net in the hope that it might attract a female. It fluttered and crawled around for a while and then, closing its wings with the upper side showing, it lay still. To my complete surprise, it was dead. The time was 11:15. Quietus had taken but a few minutes.

For the next few weeks I conducted more experiments with the following results:

On Feb. 7, 1955, at Mammee Bay I left a female *L. cassius theonus* in the nylon net in the sun at 11.13. After flying and crawling for 1 minute and 15 seconds it folded its wings outside out and became inert. At 11:15 it was dead.

At 11:23 I went through the same procedure with an *Anæa portia.* At the end of four minutes it was exhausted and a minute later it was motionless except for occasional movements of the abdomen and a few leg jerks. Its wings were folded with the underside showing. It was removed from the net and put out on a twig of a tree, but was too weak to maintain a grip. There was no change at 11:55 though it had been in a breezy place in the shade.

At 11:40 a male *Leptotes cassius theonus* was caught. 17 minutes later it was released because there appeared to be no change. However, it was quite weak, and flew for but short distances and then only when physically disturbed. During the experiment, the sun had at times been beclouded.

On Feb. 8, 1955, at 11: 25 A.M. a male *Eurema lisa euterpe* was caught at Hope Gardens and died in 1½ minutes under the same circumstances.

On Feb. 9, 1955 at noon, a male *E. messalina* was taken at Polly Ground (500 ft.) and died in 2¼ minutes. We took a male *Calisto zangis* — this time in a green nylon net. It died in 3 minutes and 40 seconds, wings folded outside out. A *Cystineura dorcas* succumbed in 15 minutes in the green net.

In the P.M. a *Eurema elathea* male was contained in the white net for many minutes. It showed weakness but did not die.

At 3:15 P.M. a male *L. cassius theonus* was captured. Four minutes later it was released with no visible effect.

On Feb. 23rd at 11:50 A.M. at Rockmore, which is close to sea level, we captured a *Heliconius charitonius simulator.* It was feeble in 8 minutes, helpless in 10, and dead a minute later with wings folded outside out. Sex was undetermined. It was placed on top of a bush to see if it might recover, and within a minute it attracted another insect of the same species which flew at it and knocked it to the ground. In dropping, the wings reversed themselves so that the underside was exposed. It was replaced on the bush and nothing happened. The wings were then folded the other way and four different insects (same species) fluttered about it.

At 12:23 a male *Eurema palmira palmira* was taken. It seemed weak at 12:27 but did not die. At 12:39 it was released to fly away rather strongly.

Have there been any other observations similar to the above? Do the above reactions come from the effects the sun has on an insect that is confined? Does nylon create static electricity that electrocutes the insect?

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BOOK REVIEWS

BUTTERFLIES OF SOUTH AFRICA; WHERE, WHEN AND HOW THEY FLY. By D. A. Swanepoel. 320 pp., 17 col. pls. 1953. Publisher: Maskew Miller Limited, 29 Adderley Street, P.O. Box 396, Cape Town, South Africa. Price: Popular Edition, 75/-; De Luxe Edition, 105/-.

This delightful book, written by an amateur for the amateurs, and illustrated by numerous photographs and 17 color plates, contains all up-to-date information concerning the distribution, flight period, and habits of all species of butterflies occuring in South Africa, south of the Limpopo River.

Of all South African butterfly collectors, Mr. SWANEPOEL is without doubt the only one competent to write a book of this nature, as his long and numerous travels over the length and width of South Africa were undertaken with the sole purpose of collecting and observing our butterflies in their natural habitats, from the low coastal plains, forests, and bushveld to the highest peaks of Basutoland.

In the course of these travels Mr. SWANEPOEL has not only discovered numerous new species, but also found the habitats of many exceedingly rare butterflies which had been represented in collections by unique types, insufficiently dated in many cases. It took Mr. SWANEPOEL sometimes many years of patient search to rediscover the haunts of a rare butterfly, but his endless patience and tireless energy triumphed in the end.

Most of the information supplied was obtained at first hand and is given freely, without any attempts to conceal any feature of importance or confuse the reader by vague statements which are so often given by collectors jealous of their discoveries. It is especially this candid treatment of each case which makes the book an invaluable guide to beginners and specialists alike, and every collector can trust the information given down to the last detail, such as the exact mileage from a known spot to the often very restricted area of occurence of a rare butterfly, or its date of emergence.

Mr. SWANEPOEL, or SWANNIE (as he is affectionately called by his numerous friends) is a born naturalist endowed with extremely acute powers of observation coupled with an infinite love of unspoiled nature and patience to find out its secrets.

The extremely pleasant and often amusing way in which Mr. SWANEPOEL tells of his experiences makes a fascinating reading for lepidopterists and laymen alike.

G. VAN SON, Transvaal Museum, Pretoria, SOUTH AFRICA

A PROVISIONAL CHECK-LIST OF THE BUTTERFLIES OF THE ETHIOPIAN REGION. By Wallace Peters. 201 pp. 1952. Publisher: E. W. Classey, 91 Bedfont Lane, Feltham, Middlesex, England. Price 45/- ($6.30).

As the name implies, this monumental check-list is meant to be a provisional guide for those interested in the butterfly fauna of the Ethiopian region. It contains the names of 2653 species, apart from the very numerous names of lower categories, described from 1758 to the date of publication, 1952.

It is obvious that the compilation of such a list must have cost the author a great deal of patience and time, but it is felt that its publication should have been postponed until the revisional work by several authors engaged in the study of African butterflies has been completed, or at least some of the recent revisional works, quoted in the *Check-List,* have been studied. This applies to species and races alike. For instance, *Papilio demodocus* Esper is given as a race of *P. demoleus* Linnæus, whereas it was conclusively shown to be a good species (van Son, 1949: 20); both the races *aureus* Moreau and *semlikana* Le Cerf belong to the species *P. lormieri* Distant and not to *P. menestheus* Drury as given by PETERS. The arrangement of *Mylothris* has been left as it was erroneously given by TALBOT, based on the fact that the male genitalia of *M. bernice* and *M. trimenia* were confused; this has resulted in the erection of two hypothetical groups, each of which had the habitus of one group and the genitalia of another! This error was duly corrected by TALBOT after he was notified of it by the present writer, who has rearranged the group correctly (van Son, 1949: 216). The far-reaching changes in the nomenclature of *Colotis* in the species *ione, erone, pallene,* and *lais* have been unnoticed, and the old erroneous arrangement of TALBOT left undisturbed. Some rather unfortunate changes have been brought about, for instance in *Precis,* where *clelia* Cramer has been given as a synonym of *œnone* Linnæus, 1764, whereas in fact Linnæus described *œnone* originally in 1758, the 1764 emendation being erroneous and invalid. The rather numerous spelling errors, both in the names of genera and those of species or forms, call at least for a corrected edition, but perhaps it would be better to wait for the appearance of some revisions now under way, in order to avoid further confusion.

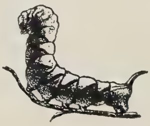
In my second volume of *Butterflies of Southern Africa,* now in the press, eight new genera and numerous new species of Satyridæ are described, and their inclusion in a revised check-list appears to be desirable; similarly, the numerous recent works by STEMPFFER, and by STEMPFFER and BENNET, have brought about considerable changes and additions in the Lycænidæ.

May I suggest that in the cases of all names published before 1864, the year in which the *Zoological Record* has made its first appearance, the full reference to the original publication be given; this would considerably assist systematic workers who may wish to refer to the original description without having to consult old catalogues which are often difficult to obtain.

G. VAN SON, Transvaal Museum, Pretoria, SOUTH AFRICA

Moths, by E. B. FORD, has just been published and will be reviewed soon in the *News.* Included are 32 colored and 24 black-and-white plates. This fine British book is the companion volume with Dr. FORD'S earlier *Butterflies.* In the U.S.A. it is available from The Macmillan Co., 60 5th Ave., New York 11, N.Y., and local booksellers for $7.50, or for a lower price from E. W. Classey, 91 Bedfont Lane, Feltham, Middlesex, England, and other British agents.

C. L. REMINGTON



RECENT LITERATURE ON LEPIDOPTERA

(Under the supervision of PETER F. BELLINGER)

Under this heading are included abstracts of papers and books of interest to lepidopterists. The world's literature is searched systematically, and it is intended that every work on Lepidoptera published after 1946 will be noticed here; omissions of papers more than 3 or 4 years old should be called to Dr. BELLINGER'S attention. New genera and higher categories are shown in CAPITALS, with types in parentheses; new species and subspecies are noted, with type localities if given in print. Larval foodplants are usually listed. Critical comments by abstractors may be made. Papers of only local interest and papers from *The Lepidopterists' News* are listed without abstract. Readers, particularly outside of North America, interested in assisting with this very large task, are invited to write Dr. BELLINGER (University College of the West Indies, Mona, St. Andrew, Jamaica, B.W.I.). Abstractors' initials are as follows: [P.B.] — P. F. BELLINGER; [A.D.] — A. DIAKONOFF; [W.H.] — W. HACKMAN; [E.M.] — E. G. MUNROE; [N.O.] — N. S. OBRAZTSOV; [C.R.] — C. L. REMINGTON; [J.T.] — J. W. TILDEN; [P.V.] — P. E. L. VIETTE.

A. GENERAL

Bergmann, A., *Die Grossschmetterlinge Mitteldeutschlands.* Vol.4: *Eulen.* Part I: 580 pp., 47 pls., 171 figs. Part 2: 480 pp., 37 pls., 132 figs. Jena: Urania-Verlag. 1954. [Not seen].

Brandt, Herbert, *Schmetterlinge.* Erster Teil (Winters Naturwissenschaftliche Taschenbücher, vol.20). 176 pp., 64 pls., 55 figs. Heidelberg: Carl Winter, Universitätsverlag. 1953. [Not seen].

Brues, Charles T., A. L. Melander, & Frank M. Carpenter, *Classification of insects. Keys to the living and extinct families of insects, and to the living families of other terrestrial arthropods. Bull. Mus. Comp. Zool. Harvard,* vol.108: v + 917 pp., 1219 figs. 1954. A revised edition of this unique work. Includes keys to adults and larvæ of Lepidoptera, revised by C. L. REMINGTON. [P.B.]

Forster, Walter, & Theodore A. Wohlfahrt, *Die Schmetterlinge Mitteleuropas,* vol.1. xii + 202 pp., 147 figs. Stuttgart: Franckh'sche Verlagshandlung, 1952-54. See reviews in *Lepid. News,* vol.6: pp. 79-80; vol.7: p.26; vol.8: pp.170-171.

Koch, Manfred, *Wir bestimmen Schmetterlinge.* Vol.1: *Tagfalter Deutschlands (unter Ausschluss der Alpengebiete).* 119 pp., 16 pls., 63 figs. Radebeul & Belrin: Neumann Verlag. 1954. [Not seen].

Koch, Manfred, & Kurt Herschel, *Falter bei Tag und bei Nacht.* 288 pp. (incl. 132 col. pls.) Radebeul & Berlin: Neumann Verlag. 1953. [Not seen].

Tietz, Harrison M., *The Lepidoptera of Pennsylvania. A manual.* xii + 194 pp., 2 figs. State College, Pa. 1952. See review in *Lepid News,* vol.8: pp.172-173.

B. SYSTEMATICS AND NOMENCLATURE

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Amsel, H. G., "Zur Nomenklatur von *Lita amaurella* Rbl. (Lepidoptera: Gelechiidæ)" [in German]. *Zeits. Wiener Ent. Ges.,* vol.38: pp.274-275. 15 Oct. 1953. Proposes new name: *Gnorimoschema hispanicella* (=*Lita amaurella* Rbl., 1927, *nec* Hering, 1924). [N.O.]

Bauer, David L., "An apparent hybrid *Limenitis* from Arizona." *Lepid. News,* vol.8: pp.129-130. 20 Oct. 1954.

Beirne, Bryan P., *British pyralid and plume moths.* 208 pp., 16 pls., 189 figs. London: Frederick Warne & Co., Ltd., 15 Sept. 1952. (See review in *Lepid. News,* vol.8, p.49).

Berger, L. R., "*Liptena* (*Tetrarhanis*) nouveaux du Congo Belge (Lepidoptera Lycænidæ)" [in French]. *Ann. Mus. Roy. Congo Belge, Sci. Zool., ser. in* 4°, n. s. vol.1: pp.306-309, 13 figs. 1954. Descriptions of two new species of *Liptena* from the Belgian Congo: *L.* (*T.*) *stempfferi* and *L.* (*T.*) *schoutedeni.* [P.V.]

Bigelow, R. S., & C. Reimer, "An application of the linear discriminant function to insect taxonomy." *Canad. Ent.,* vol.86: pp.69-73. 10 March 1954. Definition of comparative characters in quantitative terms. [E.M.]

Bourgogne, J., "Un *Oreopsyche* nouveau du Portugal et de l'Espagne (Psychidæ)" [in French]. *Rev. franç. Lépid.,* vol.14: pp.133-137, 2 pls., 7 figs. 1954. Describes as new *O. matthesi,* a psychid from Portugal and Spain. [P.V.]

Boursin, Charles, "Über die Gattung *Allophyes* Tams nebst Beschreibung einer neuen Art aus Klein-Asien (Lep. Phalænidæ (Noctuidæ). (Beiträge zur Kenntnis der 'Agrotidæ-Trifinæ', 59)" [in German]. *Mitt. Münchn. Ent. Ges.,* vol.43: pp.239-247, 3 figs. 1 July 1953. Discusses systematic position and characters of the genus, and the classification of the species. Describes as new *A. metaxys* (Marash, N. Syria); proposes *Blephariata draudti* new name for *Meganephria adusta* Drdt. (*nec* Esp.). Figures moths and ♂ genitalia. [N.O.]

Boursin, Charles, "Zwei neue paläarktische *Cryphia* (*Bryophila*)-Arten (Beiträge zur Kenntnis der "Agrotidæ-Trifinæ", LX)" [in German]. *Mitt. Münchn. Ent. Ges.,* vol.43: pp.248-251, 1 pl. 1 July 1953. Describes as new *C. rückbeili* (Dzharkent, Prov.Ili) and *C. raddei* (Dshafar-Aga, Turkish Armenia); figures types and ♂ genitalia. Figures without any description *C. ravuloides,* "new species" (Kashmir). [N.O.]

Boursin, Charles, "Eine neue Gattung der Unterfamilie Agrotinæ aus dem vorderasiatisch-mediterraneen Faunenkreis. (Beiträge zur Kenntnis der 'Agrotidæ-Trifinæ' 62)" [in German]. *Zeits. Wiener Ent. Ges.,* vol.38: pp.212-217, 4 pls. 15 Aug. 1953. Describes as new *PACHYAGROTIS* (type *Cladocerotis ankarensis* Rbl.). Discusses relationship, figures genitalia and other structures of the new and related genera. [N.O.]

Boursin, Charles, "Über die systematische Stellung von "*Leucochlæna*" *orana* Lucas. Nebst Beschreibung einer neuen Gattung und einer neuen Art aus Französisch Marokko. (Beiträge zur Kenntnis der Agrotidæ-Trifinæ, 63)" [in German; French summary]. *Zeits. Wiener Ent. Ges.,* vol.38: pp.239-244, 1 pl. 15 Sept. 1953. Describes as new *EREMOCHLÆNA* (type *orana* Lucas), with *E. oranoides* (Rabat, Fr. Morocco). [N.O.]

Brown, F. Martin, "Taxonomic notes on *Œneis uhleri* Reakirt (Lepidoptera, Satyridæ)." *Amer. Mus. Novit.,* no.1625: 26 pp., 8 figs. 6 May 1953. Describes as new *O. u. reinthali* (Gothic, Colo.). Statistical analysis of size, color, and pattern variation in some populations of sspp. *reinthali, uhleri,* and *varuna* [P.B.]

Brown, F. Martin, "The subspecies of *Œneis alberta* (Lepidoptera, Satyridæ)." *Amer. Mus. Novit.,* no.1626: 21 pp., 10 figs. 6 May 1953. Statistical analysis of populations of sspp. *alberta, oslari,* and *daura;* the first two are doubtfully distinct. [P.B.]

Chiarelli de Gahan, Angelina, & Enrique Augustín Touron, "Biología y taxonomía de *Heliothis armigera* (Hbn.)" [in Spanish]. *Rev. Invest. Agric.,* vol.8: pp. 111-148, 21 figs. Aug. 1954. Synonymizes *Thyreion gelotopoeon* under *H. armigera.* Gives an extremely thorough description of all stages and biology. A model paper, but the separation of the North American species from the Old World *H. armigera* has been overlooked. [P.B.]

Clench, Harry K., "The identity of *Crambidia allegheniensis* (Lithosiidæ)." *Lepid. News,* vol.8: pp.93-94. 17 Sept. 1954.

Collenette, C. L., "New and little known African Lymantriidæ (Lepidoptera: Heterocera)." *Trans. Roy. Ent. Soc. London,* vol.105: pp.146-155, 1pl. 16 Aug. 1954. Describes as new *Cropera aphanta* (Elizabethville, Belgian Congo); *Marbla haplora* (Kigezi, 7500-8000′, Uganda); *Euproctis episema* (Elizatbethville); *Paraproctis chionopeza* Mpika, N. Rhodesia); *Memerophanes diatoma triphyes* (Elizabethville); *Dasychira thika* (Thika Road, Kenya); *Euproctidion periblepta* (Elizabethville); also several "forms". Figures adults. Revisional notes and new synonymy in *Hemerophanes* and *Dasychira,* and notes on some other spp. [P.B.]

Collenette, C. L., "Two new Lymantriidæ from the Belgian Congo." *Rev. Zool. Bot. Afric.,* vol.50: pp.7-9, 2 figs. Nov. 1954. Describes as new *Dasychira phædropoda* and *D. eudela,* both from Elizabethville. [P.V.]

Cox, Constance E., "Analysis of frequency distribution of adults and larvæ of *Choristoneura fumiferana* (Clem.) and *C. pinus* Free. (Lepidoptera: Tortricidæ)." *Canad. Ent.,* vol.85: pp.136-141, 4 figs. 15 April 1953. Significant differences in postclypeal indices and uncus widths are shown for the two species. In addition, a bimodality of unexplained origin is shown in 2 larval and one adult character of *C. pinus.* Frequency distributions of these characters in *C. fumiferana* were unimodal. [E.M.]

Daniel, Franz, "Neue Heterocera-Arten und -Formen" [in German]. *Mitt. Münchn. Ent. Ges.*, vol.43: pp.252-261, 1 pl. 1 July 1953. Describes as new *Spilarctia tschitaensis* (Tshita, Transbaicalia), *S. hanoica* (Hanoi, Tonking); *Callimorpha quadripunctaria rhodosensis; SELENEPHERIDES,* and type *S. monotona* (Tapaishan in Tsinling, S. Shensi), *S. m. likiangica* (Li-kiang, N. Yunnan); *Lemonia syriensis* (Marash, N. Syria); *Cossus cossus afghanistana* (Wardik, Afghanistan), *C. aksuensis* (Ak-su Valley, Thianshan); *DYSPESSACOSSUS,* and type *D. hadjinensis* (Hadjin, Asia Minor); *Catopta thrips polonica* (Babince, Podolia); *Dyspessa salicicola aschabadensis* (Aschabad, C. Asia). [N.O.]

Daniel, Franz, "Untersuchung der Typen von *Endrosa pseudokuhlweini* Vorbr. (Lep.-Het)" [in German]. *Nachrbl. Bayer. Ent.*, vol.3: pp.52-54, 1 fig. 15 May 1954. Discusses distinguishing features of this and other European *Endrosa* species. [N.O.]

Drianovski, A., "*Crypsedra niphopasta* Obrth. (Insecta, Lepidopt.) subsp. *bulgarica* aus Bulgarien" [in Bulgarian, German summary]. *Izv. Zool. Inst. Bulg. Akad. Nauk.*, vol.3: pp.373-376. 1953. New subspecies. [Not seen].

Dufrane, A., "Sur quelques Lycænidæ d'Afrique [in French]. *Bull. Ann. Soc. Ent. Belg.*, vol.90: pp.282-286. Oct. 1954. Notes on the determinations and the last publications of the author on African Lycænidæ. Describes as new *Iolaus silas maureli* (Harrar, Ethiopia); *Spindasis trimeni congolanus* (Luebo, Belgian Congo); *Axiocerces maureli* (Harrar, Ethiopia). Types in the author's collection. [P.V.]

Dufrane, A., "A propos de *Syntarucus pulchra* Murray (Lép. Lyc.)" [in French]. *Bull. Ann. Soc. Ent. Belg.*, vol.90: pp.66-68. 1954. Correction of the citation of *S. pulchra* from Kivu (Belgian Congo). [P.V.]

Ehrlich, Paul R., "Notes on *Erebia rossii* Curtis (Lepidoptera, Satyridæ)." *Ent. News*, vol.65: pp.225-227. 1954. Suggests that *E. r. gabrieli* dos Passos will prove to be a synonym of *E. r. kuskoquim* Holland. Speculates as to the possible causes of the peculiar distribution of *E. rossii.* [J.T.]

Ferguson, Douglas C., "On the identity and status of *Eubaphe lamæ* Freeman (Lepidoptera, Arctiidæ)." *Canad. Ent.*, vol.85: pp.371-373, 9 figs. 21 Oct. 1953. Considers *E. lamae* a sp. distinct from *E. aurantiaca.* The application of the name *bimaculata* is doubtful. [E.M.]

Ferguson, Douglas C., "Revision of the *occiduaria-argillacearia* complex of the genus *Itame,* with descriptions of new races (Lepidoptera, Geometridæ)." *Canad. Ent.*, vol.85: pp.453-461, 18 figs. [numbered 1-4, 1-14:]. 30 Dec. 1953. Describes as new "races" *I. andersoni orientis* (Auburn, Kings Co., N. S.) and *I. sulphurea amboflava* (Calgary, Alta.). Distinguishes *I. occiduaria, andersoni, argillacearia,* and *sulphurea.* A useful and needed contribution. [E.M.]

Ferguson, Douglas C., "A revision of the genus *Hypenodes* Doubleday with descriptions of new species (Lepidoptera, Phalænidæ)." *Canad. Ent.*, vol.86: pp.289-298, 3 pls. 20 Aug. 1954. Describes as new: *H. palustris* (Prospect Road, Halifax Co., N. S.), *H. sombrus* (Concord, N. H.), and *H. franclemonti* (Halifax Co., N. S.). An excellent paper. [E.M.]

Fletcher, D. S., "A revision of the genus *Eubaphe* (Lepidoptera: Geometridæ)." *Zoologica, N. Y.*, vol.39: pp.153-166, 63 figs. 31 Dec. 1954. Describes as new *E. pumilata* (Holguin, Cuba); *E. unicolor venustata* (Calderas, Guatemala); *E. deceptata* (Orizaba, Mexico); *E. fieldi* (San Esteban, Venezuela); *E. orfilai* (Matto Grosso, Brazil). Synonymizes *E. aurata* under *Oncopus citrosa.* Redescribes 21 spp., figuring genitalia of 20. Resdescribes genus and the related genera *Eudule* and *Eudulophasia,* and lists spp. of these. The valid name for the arctiid genus usually called *Eubaphe* is stated to be *Holomelina.* [P.B.]

Fletcher, D. S., & E. T. M. Reid, "A synonymic list of the genus *Arcyphora* Guenée (Agrotidæ, Westermaniinæ). With observations on adult feeding habits." *Proc. Roy. Ent. Soc. London (B)*, vol.24: pp.197-204. 31 Dec. 1954. *Sectotena* and *Goniexestis* are synonyms of *Arcyphora.* Key to known species. Adults of at least 3 spp. feed on the lacrymal exudations of cattle. [P.B.]

Forbes, William T. M., "Presidential address to Los Angeles meeting of the Lepidopterists' Society." *Lepid. News,* vol.8: pp.1-4. 25 June 1954.

Freeman, T. N., "A note on the occurrence of a European tortricid, *Cnephasia virgaureana* Treit., in Newfoundland with new synonymy (Lepidoptera)." *Canad. Ent.*, vol.85: p.291. 16 Sept. 1953. Sinks *oleraceana* as a synonym. [E.M.]

Freeman, T. N., "The spruce budworm, *Choristoneura fumiferana* (Clem.) and an allied new species on pine (Lepidoptera: Tortricidæ)." *Canad. Ent.*, vol.85: pp.121-127, 22 figs. 15 May 1953. Describes as new and figures *C. pinus* (Beauséjour, Man.), a widely distributed Canadian pine-feeding sp., and compares it with the sibling sp. *C. fumiferana* and with certain other Nearctic relatives. [E.M.]

Gerhardinger, Klaus, "*Diacrisia sannio* L." [in German]. *Zeits. Wiener Ent. Ges.*, vol.38: pp.289-308, 1 pl. 15 Nov. 1953. Monograph. [N.O.]

Gillham, Nicholas W., & Paul R. Ehrlich, "The naming of subspecies in Lepidoptera." *Lepid. News*, vol.8: p.100. 17 Sept. 1954.

Herbulot, Cl., "Lépidoptères géometrides" in "La réserve naturelle integrale du Mont Nimba" [in French]. Mem. Inst. Franç. Afr. Noire, no.40: pp.301-333, 1 pl., 17 figs. 19 Nov. 1954. Study of a collection of Geometridæ from the Nimba Mts. (French Guinea); describes as new: *Mixocera sudanica* (Geometrinæ); *Scopula mendax, S. subsincera* (Sterrhinæ); *Piercia occidentalis, Ctenaulis acutivalvis* (Larentiinæ); *Eulycia excavata, Colocleora splendens, Miantochora fletcheri, M. lisa, M. discalis, Geolyces contracta, Mesothisa royi, Neocleora lamottei, Zamarada melanopyga, Z. corroborata, Z. cydippe, Thysanopyga limbata* (Ennominæ). [P.V.]

Hering, Erich M., "Die Gattung *Crothæma* Btl. (Lep. Cochlidiidæ)" [in German]. *Ann. Mus. Roy. Congo Belge, Sci. Zool., ser. in 4°*, n. s. vol.1: pp.381-386, 7 figs. 1954. Study of the different species of the genus *Crothæma* (of Africa and Madagascar) with a key to species. Description of a new species: *C. schoutedeni* (Belgian Congo). Erects for this genus a new subfamily CROTHÆMINÆ. The family Cochlidiidæ now contains two subfamilies: Crothæminæ (genus typicum: *Crothæma* Btl.) and Cochlidiinæ (genus typicum: *Cochlidion* Hbn.). [P.V.]

Holik, Otto, & Leo Sheljuzhko, "Über die Zygænen-Fauna Osteuropas, Kleinasiens, Irans, Zentralasiens und Sibiriens" [in German]. *Mitt. Münchn. Ent. Ges.*, vol.43: pp.102-226. 1 July 1953. Revision of *Zygæna* species on a zoogeographical basis. Discusses 6 spp. Describes as new subspecies of *Z.* (*Mesembrinus*) *purpuralis* Brünn: *Z. p. alagirica* (Uruch Valley near Ach-sau, N. Ossetia), *Z. p. alagezi* (Inaklu, Russian Armenia), *Z. p. zangezuri* (Ochtshi, near Kafan, Russian Armenia), *Z. p. talassica* (Aulie-Ata, W. Ala-tau). Names 2 aberrations of *Z. cambysea rosacea.* To be continued. [N.O.]

Kautz, Hans, "Bemerkungen zu den Arten *Pieris napi* L., *bryoniæ* O., adalwinda Fruhst. und zur mod. *hibernica* Schmidt" [in German]. *Zeits. Wiener Ent. Ges.*, vol.38: pp. 258-261. 15 Oct. 1953. Discusses characters and variation. [N.O.]

Kiriakoff, S. G., "Les Thyretidæ du Musée Royal du Congo Belge (Lepidoptera Notodontoidea)" [in French]. *Ann. Mus. Roy. Congo Belge, sér. in 8°, Sci. Zool.*, vol.26: 91 pp., 7 pls. Dec. 1953. Study of the Thyretidæ (a part of the Syntomidæ *auctt.*) of the Belgian Congo. Describes as new: *Apisa* subg. *DUFRANEELLA* (type *grisescens* Dufrane); *Thyretes cooremani* (Bas-Congo); *MESONACLIA* (type *minor* Tmps.); *DIAKONOFFIA* (type *kivensis* Dufrane); *ELSA* (type *invaria* Walker), *E. forsteri* (Kivu); *E.* subg. *RHIPIDARCTIA,* and type *E.* (*R.*) *rubrosuffusa* (Tshuapa); *MECISTORHABDIA* (type *hematoëssa* Holland); *RHABDOMARCTIA* (type *rubrilineata* Bethune-Baker), *R. similis* (Tshuapa); *HIPPURARCTIA,* and type *H. vicina* (Kivu); *H. v. overlaeti* (Lualaba); *H. bergeri* (Lualaba); *Metarctia* subg. *METARHODIA* (type *rubripuncta* Hmps.); *Metarctia deriemaeckeri* (Mt. Katanga); *M. schoutedeni* (Kivu); *M.* subg. *NOTHARCTIA* (type *flavivena* Hamps.); *Metarctia debauchei* (Ruanda-Urundo); *M. hulstaertiana* (Tshuapa); *M.* subg. *ŒNARCTIA* (type *erlangeri*); *M.* subg. *PTEROPHÆA* (type *brunneipennis* M. Hering); *Metarctia dracoena* (Sankuru); *M. seydeliana* (Mt. Katanga); *M. olbrechtsi* (Lualaba); *M. fuliginosa* (Sankuru); *M. cinctella* (Sankuru); *Balacra basilewskyi* (Sankuru); *B. distincta* (Sankuru); *B. fontainei* (Sankuru); *B.* subg. *DAPHÆNISCA* (type *daphæna* Hmps.); *B.* subg. *CALLOBALACRA* (type *rubrostriata*); *B.* subg. *COMPSOCHROMIA* (type *compsa*); *B.* subg. *LAMPROBALACRA* (type *pulchra*); *LEMPKEELLA* (type *dufranei* Kiriak.); *Paramelisa leroyi* (Kivu); *COLLARTISA,* and type *collartorum* (Tshuapa). [P.V.]

Kiriakoff, S. G., "Amatines (Lepidoptera Arctiidæ) nouveaux du Congo Belge" [in French]. *Ann. Mus. Roy. Congo Belge, ser. in 4°, Sci. Zool.*, n.s. vol.1: pp.431-434, 8 figs. 1954. Descriptions of 8 new species of Arctiidæ Ctenuchinæ from the Belgian Congo: *Myopsyche pallidicincta, M. sankuruica, M. bokumæ, Amata hypomela, A. obraztsovi, A. albobasis, A. marinoides,* and *A. schoutedeni.* [P.V.]

Kiriakoff, S. G., "Contribution à l'étude des Lépidoptères Hérocères. I. Notodontides nouveaux du Congo Belge" [in French]. *Bull. Inst. Roy. Sci. Nat. Belg.*, vol.30, no.14: 10 pp., 8 figs. April 1954. Descriptions of new spp. and new genus of Notodontidæ from Belgian Congo in Brussels Museum: *Clostera ochracearia; Desmeocræra tenera* (Katanga); *OVERLAETIA, O. grisescens* (Lupweji); *Macronadata aurivilliusi; Trotonotus castaneus* (Kafakumba); *Brachychira argyrosticta* (Kafakumba). [P.V.]

Kiriakoff, S. G., "Chorologie et systématique phylogénétique" [in French]. *Bull. Ann. Soc. Ent. Belg.,* vol.90: pp.185-198, 1 map. Aug. 1954. Thoughts of the author, after W. Hennig (1950), on the relation between chorology and phylogenetic systematics. For the author, two subspecies geographically isolated, *e.g.* in central Europe and East Asia, are two good species. The case of "genera" having numerous species in one area (*e.g.* Neotropical) and one species in another area (*e.g.* Africa) should be reconsidered. [P.V.]

Kiriakoff, S. G., "Hétérocères nouveaux et peu connus du Katanga (première partie)" [in French]. *Rev. Zool. Bot. Afric.,* vol.49: pp.293-327, 2 pls. 14 Aug. 1954. Study of the Notodontidæ collected in the Elizabethville area, Katanga, Belgian Congo. Describes as new: *GLUPHISIODES* and type, *G. bivittata; Desmeocræra dichonia, D. denisæ, D. analis, D. lugubris, D. adversa amica, D. divergens, D. collenettei, D. frater, D. rileyi; esmeocrærula basimacula; ULINELLA* and type, *U. cotytto; Fentonia umbra; ARCHISTILBIA* and type, *cineracea; BILULUA, B. atricollis* (generotype), *B. strigata; Antheua trimacula; Brachychira lunuligera.* All the types are in the Belgian Congo Museum. [P.V.]

Kiriakoff, S. G., "Hétérocères nouveaux ou peu connus du Katanga" [in French]. *Rev. Zool. Bot. Afric.,* vol.50: pp. 169-188, 2 pls. Nov. 1954. New or little known Heterocera from Katanga (Belgian Congo). Describes as new (Notodontidæ) *Desmeocræra venusta; Rhenea rufescens;* (Arctiidæ) *Aglossosia griseoargestea; DIPLONYCHODES,* and type *D. ruficeps; Caripodia pallidior; Œdaleosia conspicua; ZADADRINA* and type, *Z. metallica; Eilema leiodes, E. heringi, E. tricolorana; Phryganopsis isabellina, P. tocha, P. sorghicolor; Estigmene costalis; MENEGITES* and type, *M. nivea; Amsacta ochreolutescens, A. aliena; TAMSITA* (type *ochthœba* Hmps.); *GASTROCHRYSIA, G. lineolata.* [P.V.]

Klimesch, J., "Die europäischen *Trifurcula-* und *Ectœdemia-*Arten (Lep., Nepticulidæ)" [in German]. *Zeits. Wiener Ent. Ges.,* vol.38: pp.160-170, 191-196, 22 figs. 15 June, 15 July 1953. Revises the above genera; describes as new: *T. maxima* (Male: Nürnberg; female: Dürkheim), *T. orientella* (Gravosa, Dalmatia); *E. longicaudella* (Nagy Nyir, Hungary), *E. liguricella* (Noli, Liguria). [N.O.]

Klimesch, J., "Die an Caryophylaceen lebenden europäischen *Gnorimoschema* Busck (=*Phthorimæa* Meyr.)-Arten. Ein Beitrag zur Kenntnis der Genitalmorphologie der Gelechiiden (Lep.) sowie Beschreibung von zwei neuen Arten" [in German]. *Zeits. Wiener Ent. Ges.,* vol.38: pp.225-239, 275-282, 311-318, 46 figs. 15 Sept., 15 Oct., 15 Nov. 1953. Systematic notes, redescriptions and genitalia. Describes as new: *G. leucothoracellum* (Dürnstein, Austria) and *G. fiorii* (Gran Sasso, Abruzzo). [N.O.]

Lange, W. Harry, Jr., "Biology and systematics of plume moths of the genus *Platyptilia* in California." *Hilgardia,* vol.19: pp.561-668, 16 pls., 7 figs., 8 tables. 1950. The following are described as new: *Platyptilia pica calisequoiæ* (Hiouchi State Redwood Park, Del Norte Co., *Castilleia); P. p. sierræ* (Emigrant Gap, Placer Co., on *Castilleia); P. baueri* (Lucas Valley, Marin Co.); *P. albiciliata rubricans* (Pt. Lobos, Monterrey Co., on *Castilleia); P. lutescens* (Ivanpah Mts.. San Bernardino Co.); *P. bifida* (Hauchuca Mts., Arizona). The plates show ova, larvæ, pupæ, adults, and genitalia. History, phylogeny, economic implications and other phases of the subject are covered. The work seems to be a very complete and excellent revision of the genus. [J.T.]

Le Charles, L., "Contributions à l'étude des zygènes" [in French]. *Rev. franç. Lépid.,* vol.14: pp.143-145. 29 June 1954. Critical discussion of the paper by E. Haaf (1953) on male genitalia of Zygænidæ, with a list of subgenera and species of *Zygæna* after Burgeff, 1926. [P.V.]

de Lesse, H., "Discussion de certains caractères morphologiques d'*Arethusana arethusa* Schiff. et des formes *boabdil* Rambur et *dentata* Stgr." [in French]. *Rev. franç. Lépid.,* vol.14: pp.140-142, 11 figs. Discussion, with reference to the paper of G. Varin (1953) (cf. *Lepid. News.* vol.8, p.149) of some morphological characters of *A. arethusa* and its forms. [P.V.]

Lorkovic, Z.. & H. de Lesse, "Expériences de croisements dans le genre *Erebia* (Lépidoptères Satyridæ)" [in French]. *Bull. Soc. Zool. France,* vol.79: pp.31-39. July 1954. *E. tyndarus* and *E. hispania* are very different species in spite of the likeness of their ♂ and ♀ genitalia. The artificially produced hybrids between *tyndarus* and *hispania* are sterile and degenerated, which is not generally the case for hybrids of close species; a great difference exists in the chromosome number of *E. hispania rondoui* (n=24) and *E. tyndarus calcarius* (n=8), the material for the crossing experiments. [P.V.]

Lucas, D., "Nouveaux Lépidoptères Nord-Africains" [in French]. *Bull. Soc. Sci. Nat. Phys. Maroc,* vol.34: pp.35-39. Sept. 1954. Descriptions of new species: Noctuidæ, *Acronycta elegans* (Tunisia), and Pyralidæ and Tortricidæ from Morocco (Ifrane, unless other locality specified): *Homœosoma buckwelli, Chilo powelli* (Casablanca), *Heterographis buckwelli* (Safi), *Etiella ifraneella, Brephia marocana, Cledeobia confusalis, Myelois superbella, Pyrausta buckwelli, Tortrix obscurana, Euxanthis pallens, Olethreutes marocana, Phlyctænodes buckwelli, Anisotænia buckwelli, Hypotomorpha moghrebana* (Chavent). Also three "varieties". Short descriptions without figures; no indications on the type material in a private collection; the families are mixed. Such a work should not be accepted for publication. [P.V.]

MacKay, Margaret R., "A new species of *Sparganothis* allied to *S. pettitana* (Rob.), with description of larvæ and adults of both species (Lepidoptera: Tortricidæ)." *Canad. Ent.,* vol.84: pp.233-242, 33 figs. 29 Aug. 1952. Describes as new *S. acerivorana* (Kingsmere, Que.), a maple-feeding sibling of the mainly bass-feeding *S. pettitana.* Excellent figures, mostly comparative, are given of many structural details of various larval instars, of ♂ and ♀ genitalia, and of adults. Primary types are figured, and quantitative differences in genitalic proportions are shown graphically. A careful and detailed paper. [E.M.]

Marion, H., "Contribution à l'étude des pyrales africaines" [in French]. *Mem. Inst. franç. Afrique Noire,* no.40: pp.335-338, 3 figs. 19 Nov. 1954. Describes as new *MUNROEIA* and type, *M. lamottei* (Galleriidæ) and *Glyphodes royalis* (Pyraustidæ) from the Nimba Mts. (French Guinea). [P.V.]

Marion, H., "Deux Galleriides nouveaux de Madagascar (Lepid.)" [in French]. *Rev. franç. Ent.,* vol.21: pp.216-218, 4 figs. 1954. Descriptions of two new species of Galleriidæ from South Madagascar: *Megarthria seyrigalis* and *M. bekilalis.* [P.V.]

Mattoni, Rudolph, "(Abstract) Taxonomy and distribution in the genus *Philotes.*" *Lepid. News,* vol.8: p.8. 25 June 1954.

Michener, Charles D., "A note on a subgeneric name in the Saturniidæ." *Ent. News,* vol.62: p.124. 1953. Corrects error in previous papers, where a trivial name was misspelled and credited to the wrong author. [J.T.]

Munroe, Eugene, "The geographic variation of *Dasyuris polata* (Duponchel) in North America (Lepidoptera: Geometridæ)." *Canad. Ent.,* vol.83: pp.290-294, 12 figs. 16 Nov. 1951. Describes as new: *D. p. bradorata* (Bradore Bay, Strait of Belle Isle, Que.); *D. p. ursata* (Cameron Bay, Great Bear Lake, N. W. T.); *D. p. kidluitata* (Kidluit Bay, Richards Is., N. W. T.); *D. p. aleutiata* (Cold Bay, Alaska). Also recognized are subspecies from Greenland and from the eastern Canadian Arctic; the status of the Colorado and Ellesmere Island populations remains uncertain. Representative adults are figured. [E.M.]

Munroe, Eugene, "The *illibalis* group of the genus *Palpita* Hübner (Lepidoptera: Pyralidæ)." *Canad. Ent.,* vol.84: pp.43-55, 32 figs. 27 Feb. 1952. Describes as new: *P. cincinnatalis* (Cincinnati, Ohio), *P. freemanalis* (Brownsville, Tex.), and *P. ænescentalis* (Ottawa, Ont.), and removes *P. arsaltealis, euphæsalis* (with doubtful synonym *subjectalis),* and *magniferalis* (with synonyms *fascialis* and *guttulosa)* from synonymy of *illibalis.* Keys and figures. [E.M.]

Munroe, Eugene, "The eastern North American subspecies of the barberry geometrid (Lepidoptera)." *Canad. Ent.,* vol.86: pp.282-283, 4 figs. 10 June 1954. Describes as new *Coryphista meadi atlantica* (Irvington, N.J.), and discusses distribution and variation of this and the nominate ssp. [E.M.]

Munroe, Eugene, "A new *Phlyctænia,* with notes on two related species. (Lepidoptera: Pyralidæ)." *Canad. Ent.,* vol.86: pp.428-431, 4 figs. 22 Oct. 1954. Describes as new *P. quebecensis* (Lac Mondor, near Ste. Flore, P.Q.); sinks *tertialis* to *coronata* Hufnagel as a ssp.; raises *dionalis,* with syns. *nisœecalis, oppilalis,* and *beddeci* to ssp. of *extricalis.* [E.M.]

Munroe, Eugene, "A new pyralid of Palæarctic affinities from Colorado (Lepidoptera)." *Canad. Ent.,* vol.86: pp.499-500, 3 figs. 15 Dec. 1954. Describes as new *Metaxmeste nubicola* (Hall Valley, Park Co., Colo.). [E.M.]

Obraztsov, Nicholas, "Notes on the genus *Aterpia* Gn. (=*Esia* Heinr.)." *Ent. News,* vol.62: pp.276-278. 1951. Shows that HEINRICH'S genus *Esia* is a junior synonym of *Aterpia* Gn.; that *Aterpia* has one nearctic and three palearctic species; and that *charpentierana* (Hbn.) is predated by *corticana* (Schiff.). [J.T.]

Obraztsov, Nikolaus, "Systematische Aufstellung und Bemerkungen über die palæarktischen Arten der Gattung *Dichrorampha* Gn. (Lepidoptera, Tortricidæ)" [in German]. *Mitt. Münchn. Ent. Ges.*, vol.43: pp.10-101, 50 figs. 1 July 1953. Revision of 68 Palæarctic species: systematic notes, redescription, distribution, synonymy, bibliography, genitalia. Describes as new: subgenera *LIPOPTYCHODES* (type *bugnionana* Dup.) and *DICHRORHAMPHODES* (type *guenéeana*, new name for *politana* Gn. *nec* Schiff.); spp. *D.* (*Dicrorhampha*) *coniana* (Konia, Anatolia), *D.* (*D.*) *forsteri* (Luitpoldhaus, Allgäu), *D.* (*Lipoptychodes*) *pfisteri* (Steinernes Meer, Salzburg Alps), *S.* (*L.*) *klimeschi* (Altipiano Mantasio, Giullean Alps, Italy); sspp. *D.* (*Dicrorhampha*) *simpliciana heuseriana* (Kaiserlautern, Pfalz), *D.* (*Lipoptycha*) *resplendana eidmanni* (Volkmarshausen, N. W. Germany). New synonym: *D.* (*Lipoptycha*) *sylvicolana* Hein. (=*æratana* P. & M.). [N.O.]

Obraztsov, Nicholas, "A new species of *Hyalætha* Butler and a key to the species of the genus (Lepidoptera, Ctenuchidæ)." *Amer. Mus. Novit.*, no.1630: 3 pp. 4 Sept. 1953. Describes as new *H.* (*Paraceryx*) *malaitaensis* (Malaita, Solomon Is.). [P.B.]

Obraztsov, N. S., "Two new species of the *Amata tenuis* group (Lepidoptera, Ctenuchidæ)." *Bull. Ann. Soc. Ent. Belg.*, vol.90: pp.227-232, 3 figs. Aug. 1954. Describes as new *A.* (*A.*) *paratenuis* (S. coast of Java) and *A.* (*A.*) *subtenuis* (E. Celebes). [P.V.]

Obraztsov, Nikolaus, "Zur Nomenklatur der gewöhnlich als *Schrankia* HS., *Hypenodes* Gn. (Phalænidæ), *Lythria* Hb. (Geometridæ) und *Cledeobia* Stph. (Pyralididæ) bekannten Gattungen" [in German]. *Nachrbl. Bayer. Ent.*, vol.3: pp.81-86. 15 Sept. 1954. Discusses nomenclature, types and synonymy. [N.O.]

Obraztsov, Nicholas, "Notes on *Eressa confinis* and allied species with descriptions of a new species and a new subspecies (Ctenuchidæ)." *Lepid. News*, vol.8: pp.135-139, 3 figs. 20 Oct 1954. Describes as new *E. c. szechueniensis* (Sun-fu, Szechuen, W. China); *E. javanica* (Mt. Gede, Java, 9000').

Overlaet, F. G., "*Cymothoe sangaris* Godart et ses formes voisines" [in French]. *Bull. Ann. Soc. Ent. Belg.*, vol.90: pp.32-33. 28 Feb. 1954. Description of *C. euthalioides candidata* geogr. race nov. (Belgian Congo: Uele) and notes on *C. sangaris* (Nymphalidæ) and its populations in Equatorial Africa. [P.V.]

Overlaet, F. G., "Note sur le genre *Euryphene* Westwood (Limenitinæ) africains" [in French]. *Bull. Ann. Soc. Ent. Belg.*, vol.90: pp.215-218. August 1954. For the author, the genera *Euryphene* and *Euphædra* Hb. are good genera characterized by the scheme of the markings, the profile of the wings, and the very marked sexual dimorphism. [P.V.]

Overlaet, F. G., "Satyrides africains nouveaux" [in French]. *Lambillionea*, vol.54: pp.41-44, 3 figs. 25 Aug. 1954. Descriptions of three new *Ypthima* from the Belgian Congo: *Y. pulchra* (Katanga), *Y. præstans* (Tshiole), and *Y. diplommata* (Kafakumba). [P.V.]

Overlaet, F. G., "Trois Rhopalocères africains nouveaux" [in French]. *Ann. Mus. Roy. Congo Belge, ser. in 4°, Sci. Zool.*, n.s. vol.1: pp.490-493, 10 figs. 1954. Descriptions of three new species of butterflies from Katanga (Belgian Congo): *Euryphene schoutedeni* (Nymphalidæ), *Mycalesis schoutedeni* (Satyridæ), *Acræa schoutedeni* (Acræidæ). [P.V.]

Pearson, E. O., "The relationship between the African and South American red bollworms of cotton, *Diparopsis* and *Sacadodes*." *Empire Cotton Growing Rev.*, vol.31: pp. 171-177, 1 fig. July 1954. The correct name for *D. perditor* is *D. watersi* (Rothschild). Compares *S. pyralis* with *Diparopsis* spp. and concludes that genera are closely related but distinct on genitalic characters. Discusses biology of the genera, with particular reference to the possibility of using *Sacadodes* parasites against *Diparopsis*. [P.B.]

Pinker, Rudolf, "Beobachtungen in den Julischen Alpen" [in German]. *Zeits. Wiener Ent. Ges.*, vol.38: pp.117-181, 2 figs. 15 July 1953. Field observations in 1951. Describes as new: *Lita thurneri* (figures moth and ♂ genitalia) and *Cidaria nobiliaria juliensis*, both from Monte Montasio. [N.O.]

Reiss, Hugo, "Zygænenrassen (Lep.) der alpinen Stufe der Ost-Dolomiten und ihr vermutliches Entstehungsalter" [in German]. *Zeits. Wiener Ent. Ges.*, vol.38: pp.261-270, 1 pl. 15 Oct. 1953. Discusses geological age and variation of some alpine *Zygæna* species. Describes as new: *Z achilleæ ladiniæ* (Col. Pralongia, Ladinia, E. Dolomites) and *Z. filipendulæ wiegeli* (Col. Pradat, Ladinia); also a variety of *Z. purpuralis nubigena.* [N.O.]

Remington, Charles L., "A new name for the Colorado race of *Pieris napi.*" *Lepid. News,* vol.8: p.75. 17 Sept. 1954. Proposes *P. n. macdunnoughii* n.n. for *P. n. pseudonapi* B. & McD. (*nec* Verity).

Rungs, Ch., "La chenille arpenteuse de l'Acacia à tanin" [in French]. *Service de la Défense des Végétaux au Maroc, Travaux Originaux* no.5: 55 pp., 5 pls. Aug. 1954. Systematic and morphological study, life history, and ecology of *Tephrina pulinda deerraria* (Geometridæ), a pest of *Acacia mollissima* in Morocco. [P.V.]

Sieder, Leo, "Vorarbeit zu einer Monographie über die Gattung *Solenobia* Z. (Lepidopt. Psychidæ-Talæporiinæ)" [in German]. *Zeits. Wiener Ent. Ges.,* vol.38: pp.113-128. 15 May 1953. Describes as new: *S. thurneri* (Norish Alps), *S. klimeschi* (Lienz Dolomites), *BREVANTENNIA* n. subg. (type *triglavensis* Rbl.), *S.* (*B.*) *reliqua* (Carinthia). Diagnoses of *Solenobia* females. [N.O.]

Smith, Stanley G., "Reproductive isolation and the integrity of two sympatric species of *Choristoneura* (Lepidoptera: Tortricidæ)." *Canad. Ent.,* vol.85: pp.141-151. 15 April 1953. Discusses *in extenso* possible isolating mechanisms between *C. pinus* and *C. fumiferana.* Notes that geographic, temporal, ecological, and sexual isolation all are partially effective, but contends that temporal isolation is the most important under ordinary conditions. [E.M.]

Smith, Stanley G., "A partial breakdown of temporal and ecological isolation between *Choristoneura* species (Lepidoptera: Tortricidæ)." *Evolution,* vol.8: pp.206-224. Sept. 1954. *C. fumiferana* and *C. pinus,* on Balsam Fir and Jack Pine respectively, normally do not overlap in flight periods. The absolute failure of interspecific matings during an unusual overlap shows that sexual isolation is the effective mechanism keeping the species separate, even though interspecific mating has been obtained in the laboratory. [P.B.]

Stallings, Don B., & J. R. Turner, "Notes on *Megathymus neumoegeni,* with description of a new species." *Lepid. News,* vol.8: pp.77-82, 5 pls. 17 Sept. 1954. Describes as new *M. baueri* (Verde Hot Springs, 4000′, Ariz.)

Stempffer, H., "Considerations sommaires sur le genre *Pseuderesia* Butler (Lepid. Lycænidæ)" [in French]. *Ann. Mus. Roy. Congo Belge, ser. in* 4°, *Sci. Zool.,* n.s. vol.1: pp.523-525, 6 figs. 1954. Summary study of the ♂ genitalia of *Pseuderesia.* The genitalia of *eleaza, osheba, isca, bicolor* are all very different; those of nine other species are of the same type. near some *Mimacræa* and very different from those of the first four species cited. [P.V.]

Stempffer, H., "Contribution à l'étude des Lycænidæ de la faune éthiopienne (Lep.)" [in French]. *Bull. Soc. Ent. France,* vol.59: pp.88-93, 2 figs; pp.104-113, 1 pl., 4 figs. July, Nov. 1954. Considerations on various species of Lycænidæ of the African fauna, with descriptions of new species and subspecies: *P. drucei drucei* (Cameroon), *P. d. ugandæ* (Uganda); *Liptena* (*Tetrarhanis*) *rougeoti* (Gaboon); *Deudorix* (*Diopetes*) *aurivilliusi* (Sierra Leone), *D.* (*Diopetes*) *fumata* (Gold Coast); *Lepidochrysops intermedia cottrelli* (N. Rhodesia); *Euchrysops browni* (Belgian Congo). [P.V.]

Stempffer, H., "A revision of the genus *Aphnæus* Hübner (Rhopalocera: Lycænidæ)." *Trans. Roy. Ent. Soc. London,* vol.105: pp.493-516, 2 pls., 18 figs. 31 Dec. 1954. Describes as new *A. nyanzæ* (Katera, Sango Bay, Uganda); *A. erikssoni mashunæ* Gadzima, Umfuli R., Mashonaland); *A. e. barnesi* (Christmas Pass, S. Rhodesia); *A. jacksoni* (Labwor Hill, Karamoja, Uganda); *A. adamsi* (Bitje, Ja River, Cameroons); *A. flavescens* (Limbe, Nyasaland); also several "forms". Redescribes all known spp. Figures adults of some spp. and ♂ genitalia of most. [P.B.]

Thompson, W. R., "The philosophical foundations of systematics." *Canad. Ent.,* vol.84: pp.1-16. 30 Jan. 1952. Discussion of systematic concepts from standpoint of Thomistic philosophy. [E.M.]

Toll, S., "*Nephodesme pyrenaica* spec. nova (Lepidoptera, Tortricidæ)" [in French]. *Bull. Soc. Ent. Mulhouse 1954*: pp.45-47, 5 figs. July-Aug. 1954. Description of *N. pyrenaica* n.sp. from the Pyrenees (S. France), allied to *N. canescana* Gn. [P.V.]

de Toulgoet, H., "Description d'Arctiidæ nouveaux de Madagascar (Lep.)" [in French]. *Mém. Inst. Sci. Madagascar, ser. E,* no.4 (1953): pp.345-359, 1 pl., 11 figs. 1954. Descriptions of Arctiidæ Nolinæ and Lithosiinæ from Madagascar: *Roeselia venosalis, R. leucomelas, Eilema lemur, E. rubiginea, E. contradicta, E. hova, E. heimi, E. xantholeuca, E. catalai, Asura vadoni, Philenora ocularis, P. bipunctoides.* [P.V.]

Urbahn, Ernst, "Was versteht man unter *Melitæa hormuzaki?*" [in German]. *Zeits. Wiener Ent. Ges.,* vol.38: pp.149-152, 1 fig. 15 June 1953. Supposes it to be a synonym of *M. athalia diaminoides* Vrty. [N.O.]

Viette, P. E. L., "Descriptions de quatre nouvelles espèces malgaches de Noctuidæ quadrifides (Lepid.)" [in French]. *Lambillionea,* vol.54: pp.9-13, 2 figs. Sept. 1954.

Descriptions of four new species of Noctuidæ from Madagascar: *Epicausis splendens; E. catalai* (Diphtherinæ; from the eastern rain forest); *Xanthodesma remyi* (eastern rain forest); *Hypsiforma seyrigi* (Ophiderinæ; from the south). [P.V.]

Viette, P., "Le colloque international sur la nomenclature zoologique (Copenhagen, 1953)" [in French]. *Lambillionea,* vol.54: pp.25-32. Sept. 1954. Notes on the international colloquium on zoological nomenclature at the Copenhagen Congress, 1953.

Viette, P., "Nouveaux Thyrididæ de Madagascar (Lep.)" [in French]. *Bull. Soc. Ent. France,* vol.59: pp.118-122, 5 figs. Nov. 1954. Descriptions of new species of Thyrididæ from different parts of Madagascar: *Rhodoneura subopalina, R. translucida, R. chopardi, R. memorabilis, Striglina antiopa, Betousa milloti, Dixoa jeanneli.* [P.V.]

Viette, P. E. L., "Descriptions de quelques nouveaux Drepanidæ, Notodontidæ et Noctuidæ africains et malgaches (Lépid.)" [in French]. *Ann. Mus. Roy. Congo Belge, ser. in 4°, Sci. Zool.,* n.s. vol.1: pp.553-559, 16 figs. 1954. Descriptions of new moths from Africa and Madagascar. Drepanidæ: *Spidia primoti* (Gaboon); *Epicampoptera olivacea* (Gaboon). Notodontidæ: *Polelassothys callista abyssinica* (Abyssinia); *Hoplitis dasychirina quadratus* (Abyssinia); *Fentonina schoutedeni, F. bergeri* (Belgian Congo); *Anthena birbirana* (Abyssinia), *A. benguelana* (Angola). Noctuidae Ophiderinæ: *XYMEHOPS* and its type, *X. nigra* (Madagascar); *CATALANA* and its type, *C. vohilava* (Madagascar). [P.V.]

C. MORPHOLOGY AND CYTOLOGY

Bailey, S. W., "Hardness of arthropod mouthparts." *Nature,* vol. 173: p. 503. 13 March 1954. Reports hardness of 3 for mandibles of *Pteroloscura* caterpillar and some other insects. [P.B.]

Carpentier, F., "Nervure surnuméraire chez des intersexues mâles de *Lymantria dispar* L. (Lépidopt. Hétéroc.)" [in French]. *Bull. Ann. Soc. Ent. Belg.,* vol.90: pp.233-236. Oct. 1954. Supplementary veins in intersexual males of *L. dispar.* [P.V.]

Denuce, J. M., & G. Vandermeersche, "Étude au microscope électronique des trachées des larves d'insectes" [in French]. *Exptl. Cell Res.,* vol.6: pp.76-78, 2 figs. Feb. 1954| Structure of tracheæ of *Galleria mellonella* larvæ.

Diakonoff, A., "Considerations on the terminology of the genitalia in Lepidoptera." *Lepid. News,* vol.8: pp.67-74, 2 figs. 17 Sept. 1954.

Diakonoff, A., "Reply to the Forbes 'Notes'." *Lepid. News,* vol.8: p.169. 7 Jan. 1955.

Du Porte, E. Melville, "The protocephalon: a critique of recent interpretations," *Canad. Ent.,* vol.85: pp.41-55, 8 figs. 11 March 1953. No specific discussion of Lepidoptera. [E.M.]

Foltin, Hans, "*Aglia tau* L. und ihre dunklen Formen in Oberösterreich. Berichtigung" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 33: p. 137. 1 Dec. 1948.

Forbes, Wm. T. M., "Notes on the terminology of the lepidopterous male genitalia." *Lepid. News,* vol.8: pp.167-168. 7 Jan. 1955.

Golbach, R., "Notas sobre algunos insectos teratológicos" [in Spanish, German summary]. *Acta Zool. Lilloana,* vol. 10: pp. 189-196, 1 pl., 2 figs. 1952. Describes and figures specimen of *Atrophaneura zacynthus* with defect in one wing. [P.B.]

Henke, Karl, "Einfache Grundvorgänge in der tierischen Entwicklung I. Über Zellteilung, Wachstum und Formbildung in der Organentwicklung der Insekten" [in German]. *Naturwiss.,* vol. 34: pp. 149-157, 180-186, 14 figs. "1947" [Feb., March 1948]. Study of scale development in *Ephestia kühniella* and wing development in *Drosophila.* [P.B.]

Henke, Karl, "Einfache Grundvorgänge in der tierischen Entwicklung II. Über die Entstehung von Differenzierungsmustern" [in German]. *Naturwiss.,* vol. 35: pp. 176-181, 203-211, 239-246, 19 figs. "1948" [Dec., 1948; Jan., Feb. 1949]. Study of pattern development in wings of Lepidoptera. [P.B.]

Ivanova, T. S., "Innervation of the silk gland and the anatomical structure of its unpaired excretory duct in the tussah moth *Antheræa pernyi* Guer." [in Russian]. *Ent. Obozr.,* vol.33: pp.198-200. 1953. [Not seen].

Malcolmson, Richard O., "Arthropod teratology." *Canad. Ent.* vol.85: pp.313-315, 2 figs. 30 Sept. 1953. Figures and briefly describes a bilateral gynandromorph of "*Samia*" *cecropia.* [E.M.]

Piepho, H., "Über die Ausrichtung der Schuppenbälge und Schuppen am Schmetterlingsrumpf" [in German]. *Naturwiss.,* vol.41: p.22, 2 figs. Jan. 1955. Orientation of scales on body of *Galleria mellonella* reversed by rotation of a piece of larval body wall. [P.B.]

Pohley, H. J., "Über das Wachstum der Imaginalanhänge des Hinterflügels von *Ephestia kühniella* und die Annahme selbständig mutationsfähiger Unterheiten in den Chromosomen" [in German]. *Naturwiss.*, vol.41: pp.483-484. Oct. 1954. Increase in cell number in hindwing rudiment of *E. kühniella.* [P.B.]

Schvanvich, B. N., "Patterns of Lepidoptera, chiefly of Heterocera" [in Russian]. *Zool. Zhurn.*, vol. 32: pp. 874-885. Sept./Oct. 1953. [Not seen].

Sibatani, Atuhiro, Masami Ogata, Yoshio Okada, & Hiromu Okagaki, "Male genitalia of Lepidoptera: morphology and nomenclature. I. Divisions of the valvæ in Rhopalocera, Phalænidæ (=Noctuidæ), and Geometridæ." *Ann. Ent. Soc. Amer.*, vol. 47: pp. 93-106, 2 pls. March 1954. Discusses homology of parts of valves in these three groups; describes the plan of the valves and their modification, and presents a list of redefined terms which should be used for the parts. [P.B.]

Snodgrass, R. E., "Insect metamorphosis." *Smiths. Misc. Coll.*, vol.122, no.9: iii - 124 pp., 17 figs. 1 April 1954. General account of the morphology and morphological changes of the early stages of insects, with theoretical consideration of the origin and significance of metamorphosis. The structure and function of the endocrine glands concerned with metamorphosis are also summarized. [P.B.]

Yagi, Nobumasa, "Studies on the compound eyes of Lepidoptera. 1. On the compound eyes of butterflies, especially on the pseudopupil and its meaning to the phylogeny of species. 2. On the morphology and function of the compound eyes of Hesperiidæ." *Journ. Fac. Textiles Sericult. Shinsu Univ.*, vol.1: pp.131-173, 6 pls.; vol.3: pp.29-41, 2pls. 1951, 1953. [See review in *Lepid. News,* vol.8, p.146].

D. VARIATION AND GENETICS

Bernardi, G., "Note sur la variation géographique de l'armure génitale mâle de *Dixeia doxo God.* (Lep. Pieridae)" [in French]. *Rev. franç. Ent.*, vol.21: pp.122-124. 8 figs. 1954. Study of the geographical variation of ♂ genitalia of this species of Africa and Madagascar. [P.V.]

Bretschneider, Richard, "Erfolgreiche Zuchten von *Biston*-Hybriden (Lep. Geom.)" [in German]. *Mitt. Münchn. Ent. Ges.*, vol.43: pp.305-314, 2 pls. 1 July 1953. Describes and figures new and some of the already known interspecific *Biston* hybrids; lists all known hybrids of the genus; names new ones and a mutation. [N.O.]

Brower, Lincoln P. & Jane Van Zandt, "The heredity of some spot aberrations in *Lycæna phlæas* and *L. hypophlæas.*" *Lepid. News,* vol.8: pp.125-129. 20 Oct. 1954.

Burmann, Karl, "*Pammene tomiana* Z." [in German.] *Zeits. Wiener Ent. Ges.*, vol.38: pp.333-339, 1 pl. 15 Dec. 1953. Discusses variation and biology. [N.O.]

Hovanitz, William, "The biology of *Colias* butterflies. II. Parallel geographical variation of dimorphic color phases in North American species." *Wasmann Journ. Biol.*, vol.8: pp.197-219. 1950. This paper continues the work so well done in paper I of the series. Percentages of white females are given for samples of all North American species. These percentages range from nearly 100% white females in a given population, to as low as 1% or less. In general, the percentage of white females in any given population of *Colias* is higher in the populations in the northwestern part of the range, and diminishes southerly. It is highest in central Alaska and least in the prairie regions. [J.T.]

Huard, G., & J. M. Corbe, "Contribution à l'étude des variations dans la forme de la voilure, chez *Parnassius apollo* L. Notion d'index ptérique (deuxième note)" [in French]. *Bull. Soc. Zool. France,* vol. 78: pp. 325-334, tables A to K. "1953" 1954. Biometric study on the relations between the different lengths of the anterior wings of *P. apollo,* with considerations on the value of some French subspecies. Pteric index and the angle "V" are defined. The mensurations are made on more than 200 specimens and also on Charles Oberthür's publications. [P.V.]

Huxley, Julian, "Polymorphism & evolution." *Journ. Sci. Indust. Res.*, vol.13A: pp.211-212. May 1954. Explains polymorphism in animal populations (*e.g.* white and yellow forms of ♀ *Colias*) as an expression of a genetic mechanism adjusting the species as a whole to two or more opposing conditions, notably cold and hot weather. [P.B.]

Le Marchand, S., "Note sur un nouveau cas de mélanisme chez *Mesoacidalia charlotta* How." [in French]. *Rev. franç. Lépid.*, vol. 13: p. 216, 1 fig. "March/April" [25 July] 1952. Figures melanic form.

Löberbauer, Rudolf, "Die Variationsbreite von *Hydriomena ruberata* Frr." [in German]. *Zeits. Wiener Ent. Ges.*, vol. 38: pp. 19-21, 1 pl. 1 March 1953. Describes variation, naming 4 new "forms"; figures 14 specimens. [P.B.]

Loritz, Jean, "Nouvelles aberrations d'*Erebia euryale adyte* Hb." [in French]. *Rev. franç. Lépid.*, vol. 13: pp. 201-202, 2 figs. "March/April" [25 July] 1952. Names 4 aberrations.

Makino, Katashi, Hitoshi Takahashi, Kyoo Satoh, & Kaoru Inagami, "Abnormal accumulation of 3-hydroxy kynurenine in the mutant 'aka-aka' of the silkworm." *Nature*, vol. 173: pp. 586-587. 27 March 1954.

Mather, Bryant, "Size of *Papilio glaucus* in Mississippi." *Lepid. News*, vol.8: pp.131-133, 1 fig. 20 Oct. 1954.

Monroe, Burt L., Jr., "A hybrid *Limenitis*." *Lepid. News*, vol. 7: p. 53. 29 July 1953.

Nepveu, P., "Nouvelles localités françaises de *Conista alicia* Laj. dans la vallée du Rhône et description d'une forme nouvelle de cette espèce" [in French]. *Rev. franç. Lépid.*, vol. 13: pp. 179-180. "Jan./Feb." [31 May] 1952. Describes a new "form", probably a local race. [P.B.]

Osthelder, Ludwig, "Ein Beitrag zur Variationsbreite von *Crambus margaritellus* Hb." [in German]. *Nachrbl. Bayer. Ent.*, vol. 1: pp. 10-13. 15 Feb. 1952. "Berichtigungen". *Ibid.*, p. 24. 15 March 1952. Discusses the local population from Kochel, S. Bavaria; names 4 aberrations. [N.O.]

Pfister, Hermann, "*Acalla rufana* Schiffm. - ihr Leben und ihr Formenkreis" [in German]. *Nachrbl. Bayer. Ent.*, vol.3: pp.66-67. 15 July 1954. Discusses variation and biology. [N.O.]

Pfister, Hermann, "*Crambus maculalis* Z. (Microlep.-Pyralidæ)" [in German]. *Nachr. Bayer. Ent.*, vol.3: pp.21-22. 15 Feb. 1954. Discusses variation and biology in S. Bavaria. [N.O.]

Pfister, Hermann, "Schwarze Falter am 'Hohen Licht' " [in German]. *Nachrbl. Bayer. Ent.*, vol.3: pp.63-64. 15 June 1954. Discusses melanism of alpine moths. [N.O.]

Pohley, Hans-Joachim, "Über die Unterteilung der Chromosomen in identische Mutationseinheiten bei *Ephestia*" [in German]. *Naturwiss.*, vol. 40: pp. 145-146, 1 fig. Feb. 1953. Effects of larval age at irradiation on the development of a somatic mutation producing local dark scaling on the hind wing. [P.B.]

Rambold, Alois, "Extreme Zwergform von *Papilio machaon* L." [in German]. *Nachrbl. Bayer. Ent.*, vol. 2: p. 80. 15 Oct. 1953. Life story of a dwarfish specimen. [P.B.]

Remington, Charles L., "Two new genes, 'whitish' and 'blonde', producing pale males and females of *Colias philodice*." *Lepid. News*, vol. 7: pp. 139-145, 2 figs. 12 Feb. 1954.

Remington, Charles L., "The genetics of *Colias* (Lepidoptera)." *Advances in Genetics*, vol.6: pp.403-450, 6 figs. 1954. Review of *Colias* variation and genetics, with special reference to female color polymorphism in which white wing color is produced by the sex-limited autosomal dominant gene "Alba" (*A*). Similar genes in other Lepidoptera compared. Larval variation and other wing-color mutants are also discussed. [P.B.]

Remington, Charles L., "A new pale male of *Colias philodice*." *Lepid. News*, vol.8: p.76. 17 Sept. 1954.

Remington, Charles L., "The inheritance of hindwing discal spot color in *Colias philodice*." *Lepid. News*, vol.8: pp.163-166. 7 Jan. 1955.

Sevastopulo, D. G., "The apparent influence of isolation in some species of Geometridæ." *Lepid. News*, vol. 7: p. 172. 12 Feb. 1954.

Sheppard, P. M., "Polymorphism and population studies." *Symp. Soc. Exper. Biol.*, no. 7: pp. 274-289 2 figs. 1953. Discussion of the action of selection on a pattern gene of *Panaxia dominula* which can be recognized in both heterozygote and homozygote and whose frequency in a natural population is under study. [P.B.]

Stoughton-Harris, Geoffrey, "Une aberration absolument mélanisante d'*Argynnis dia*" [in French]. *Rev. franç. Lépid.*, vol. 13: p. 142, 2 figs. "Nov./Dec. 1951" [28 March 1952].

Urbahn, E., "Eine verdunkelte Form von *Pelosia muscerda* Hufn." [in German]. *Nachrbl. Bayer. Ent.*, vol. 2: pp. 23-24. 15 March 1953. Describes and names an aberration. [N.O.]

Wolfsberger, Josef, "Die südlichsten Fundorte von *Biston betularia* L. f. *carbonaria* Jord. und f. *insularia* Th.-M. in Deutschland (Lep. Geometridæ)" [in German]. *Nachrbl. Bayer. Ent.*, vol. 2: pp. 20-22. 15 March 1953. Summary and observations on the distribution of these melanistic forms in S. Bavaria and the Alps. [N.O.]

E. DISTRIBUTION AND PHENOLOGY

Aguilar, J., "*Hyphantria cunea* Drury espèce d'origine américaine fera-t-il bientot de notre faune? (Lep. Arctiidæ)" [in French]. *Bull. Soc. Ent. France,* vol. 58: pp. 7-8. 1953. On the repartition and the life-history of this imported species in Central Europe. [P.V.]

Alvas, Juho, "*Perittia obscurepunctella* Stt. funnen inom Finlands nuvarande gräns" [in Swedish]. *Notul. Ent.,* vol. 30: p. 128. Dec. 1950. Species new to Finland. [W.H.]

Andriiashev, A. P., "Mass findings of *Semasia diniana* on the ice in the high latitudes of eastern Siberian Sea" [in Russian]. *Priroda,* vol. 36, no. 9: pp. 77-78. Sept. 1947. [Not seen.]

Anonymous, "Outbreaks and new records. United States." *Plant Prot. Bull.,* vol. 1: pp. 90-91. March 1953. *Platyedra vilella,* new to United States; on cotton, hollyhock etc. [P.B.]

Aubert, J. F., "Les Lépidoptères alpins soi-disant captures dans le Jura" [in French]. *Rev. franç. Lépid.,* vol. 14: pp. 31-34. 1953. List of spp. wrongly cited from the Jura mountains. [P.V.]

Aubert, J. F., "Macrolépidoptères peu connus de la faune suisse. Nouvelles observations concernant *Procus versicolor* Bkh." [in French]. *Rev. franç. Lépid.,* vol. 14: pp. 70-76, 4 figs. "1953" [1954]. Little known Macrolepidoptera of Switzerland and new observations about *Procus versicolor* (=*miana* auct.). [P.V.]

Bailey, F. M., "Notes on butterflies from Nepal." *Journ. Bombay Nat. Hist. Soc.,* vol. 50: pp. 64-87, 281-298, 2 pls., 1 map. Aug., Dec. 1951. Annotated list of 365 spp.

Banergee, S. N., & R. A. French, "A note on the variability in the appearance of the brood in some British Lepidoptera." *Proc. Roy. Ent. Soc. London (A),* vol. 27: pp. 111-116, 3 figs. 19 Dec. 1952. Phenological data, covering 8 years, on 17 spp. of Macroheterocera; based on light trap captures. [P.B.]

Bentinck, G. A., "Nieuwe en zeldzame Lepidoptera in 1951 en eerder" [in Dutch (New and rare Lepidoptera in 1951 and earlier)]. *Verslag 84ste Wintervergad. Nederl. Ent. Vereen.,* pp. cxiii-cxiv. 15 Dec. 1952. Records 10 spp. of Microlepidoptera as new for the Dutch fauna. [A.D.]

Bentinck, G. A., "Niewe en zeldzame Lepidoptera in 1952 en eerder" [in Dutch, English summary]. *Ent. Berichten,* vol. 15: pp. 21-23. 1 Feb. 1954. Records as new for the Dutch fauna: *Acalla shepherdana, Epiblema scopoliana, Xystophora hornigi, Nepticula spinosissimæ, N. luteela, Antispila petrevi.* [A.D.]

Berger, L. A., "Espèces nouvelles pour la faune belge" [in French]. *Lambillionea,* vol. 51: p. 17. 25 April 1951. *Meliana flammea.*

Bernardi, G., "Contribution à l'étude de l'Aïr. (Mission L. Chopard et A. Villiers). Lépidoptères Pierididæ" [in French]. *Mém. Inst. franç. Afr. Noire,* no. 10: pp. 265-267. 12 Dec. 1950. Annotated list of 10 spp.

Bernardi, G., "Mission A. Villiers au Togo et au Dahomey (1950). XI. Lépidoptères Pieridæ" [in French]. *Bull. Inst. franç. Afr. Noire,* vol. 14: pp. 837-841. "July" [Sept.] 1952. Records 17 spp.; gives known distribution of each. [P.B.]

Bernardi, G., "Lépidoptères Pieridæ receuillis à Fernando-Poo par MM. B. L. Dekeyser, P. Lepesme" [in French]. *Bull. Inst. franç. Afr. Noire,* vol. 15: pp. 1437-1440, 2 figs. 1953. List of 5 spp. of Pieridæ with the study of ♂ and ♀ of *Mylothris poppea furvus,* of which only the holotype ♀ was known. [P.V.]

Best, A. E. G., "The butterflies of Bombay and Salsette." *Journ. Bombay Nat. Hist. Soc.,* vol. 50: pp. 331-339. Dec. 1951. Annotated list of 105 spp.

Beszilla, L., "Occurrence of *Chloridea obsoleta* Fb. in Hungary [in Magyar]. *Agrartudomany.* vol. 3: pp. 657-658. 1951. [Not seen.]

Betz, J. T., "Nouvelles stations belges de *Boloria aquilonaris* Stich. et d'*Argynnis aphirape* Hb." [in French]. *Lambillionea,* vol. 53: p. 48. 1953. New localities, in Belgium, for these two spp. [P.V.]

Betz, J. T., "Hypothèses ou explications?" [in French]. *Rev. franç. Lépid.,* vol. 13: pp. 312-313. "Oct./Nov./Dec. 1952" [25 March 1953]. A word of caution against regarding new local records as range extensions, in cases where the species may have been overlooked or artificially imported. [P.B.]

Beyrer, Alois, "*Biston betularia* L. f. *carbonaria* Jordan" [in German]. *Nachrbl. Bayer. Ent.,* vol. 2: p. 56. 15 July 1953. New record in Swabia. [N.O.]

Beyrer, Alois, "*Lymantria monacha* L. f. *nigra* Frr. und f. *eremita* O." [in German]. *Nachrbl. Bayer. Ent.,* vol. 2. p. 56. 15 July 1953. New records in Swabia. [N.O.]

Blackie, J. E. H., "Further notes on *Strymonidia pruni* L." *Entomologist,* vol. 85: pp. 93-94. Apr. 1953. Factors limiting distribution. [P.B.]

Bourgogne, J., "Confirmation de la présence en France d'*Acronycta menyanthidis* Vierv. (Phalænidæ)" [in French]. *Rev. franç. Lépid.,* vol. 14: p. 52, 2 figs. 1953.

Bourgogne, J., "Note sur une espèce rare observée en Laponie: *Gazoryctra fuscoargenteus* B.-Haas (Hepialidæ)" [in French]. *Rev. franç. Lépid.,* vol. 14: pp. 106-107, 1 fig. 1954. Capture, in Lappland, of *G. fuscoargenteus,* with the bibliography of this species. [P.V.]

Bourgogne, J., "La sous-espèce *helvetica* Ruhl (*pseudathalia* Rev.) de *Melitæa athalia* existe-t-elle en Gironde?" [in French]. *Rev. franç. Lépid.,* vol. 14: pp. 116-118. 1954. Considerations about the bibligraphical indications on the presence of *M. a. helvetica* in Gironde (S. W. France). [P.V.]

Bradley, J. D., L. Chopard, & D. S. Fletcher, "Contribution à l'étude de l'Aïr. (Mission L. Chopard et A. Villiers). Lépidoptères nocturnes" [in French]. *Mém. Inst. franç. Afr. Noire,* no. 10: pp. 270-272, 1 pl. 12 Dec. 1950. Annotated list: Arctiidæ 1, Agaristidæ 1, Noctuidæ 20, Lymantriidæ 1, Sphingidæ 3, Geometridæ 7, Cossidæ 1, Lasiocampidæ 5, Limacodidæ 3, Pyralidæ 7, Plutellidæ 1, Tineidæ 3. Figures larval cases of a psychid. [P.B.]

Bretschneider, R., "Neubesiedlung der Dresdner Fauna durch Einwanderung und Verbreitung mehrerer Makrolepidopteren" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 34: pp. 166-168. 31 Dec. 1949. Range extensions of *Heteropterus morpheus, Cidaria procellata, Horisme corticata bretschneideri, Hemistola chrysoprasaria, Cosymbia orbicularia.* [P.B.]

de Bros, Emm., & H. Thomann, "Beitrag zur Schmetterlingsfauna des Bergells (Val Bregaglia), Graubünden, Schweiz" [in German]. *Ent. Nachrbl.,* vol. 4: pp. 62-66; vol. 5: pp. 1-5, 21-23; 2 pls. Apr./Dec. 1952. Jan./Feb., Mar./Apr. 1953. Annotated list of 309 spp. in 23 familes (mainly Macrolepidoptera). Names 2 "forms" of *Syntomis phegea.* Compares *Gnophos dognini* with related spp. in adult and larval stages. *Lita discontinuella* new to Switzerland. [P.B.]

de Bros, E., "Un Lépidoptère nouveau pour la Suisse: *Chytolita cribrumalis* Hb. (Phalænidæ — Hypeninæ)" [in French]. *Mitt. Schweiz. Ent. Ges.,* vol. 27: pp. 53-54. 1954. A new moth for the fauna of Switzerland: *C. cribrumalis.* [P.V.]

Bros de Puechredon, E., "Une géomètride alpine méconnue du Jura *Catascia dognini* Thierry Mieg" [in French]. *Rev. franç. Lépid.,* vol. 14: pp. 5-7, 2 figs. 1953.

Bruun, Henrik, "Några iakttagelser över storfjärifalunan (Macrolepidoptera) i den västnyländska skargården. Ingå: Barösund (N)" [in Swedish]. *Notul. Ent.,* vol. 28: pp. 105-114. Apr. 1949. List of the macros of some islands in the archipelago of South Finland. Describes an aberration of *Herminia derivalis* Hbn. [W.H.]

Burmann, Karl, "Ein spätsommerlicher Sammeltag in den Stubaieralpen" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 33: pp. 21-23. 1 Oct. 1948. Collecting above 3000 m. in Austrian Alps. [P.B.]

Burmann, Karl, "Drei für Oesterreich neue *Lita*-Arten aus Nordtirol. *Lita gypsophilæ* Stt., *ocymoidella* Wglsh. und *poschiavensis* Rbt. (Lepidoptera, Gelechiidæ)" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 34: pp. 68-71. 15 May 1949. New records for Austria; describes rearing. [P.B.]

Burmann, Karl, "Aussergewöhnlich häufiges Vorkommen von Kleinfalterraupen" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 34: pp. 125-127. 15 Sept. 1949. Reports mass appearances of *Anchinia laureolella, A. daphnella, Choreutis bjerkandrella, Nepticula sorbi, Steganoptycha mercuriana* (not all in the same year). [P.B.]

Cary, Margaret M., "A study of the Sphingidæ (Hawkmoths) in the Antillean-Caribbean Region." *Nat. Hist. Notes Nat. Hist. Soc. Jamaica,* no. 49: pp. 7-8. July 1951. Outline of project.

Clayhills, Thomas H., "*Antitype flavicincta* F. ny för Finlands fauna" [in Swedish]. *Notul. Ent.,* vol. 31: p. 128. Dec. 1951. *A. flavicincta* new to Finland. [W.H.]

Cleu, H., "Supplément au peuplement en Lépidoptères du bassin superieur de la Durance" [in French]. *Rev. franç. Lépid.,* vol. 13: pp. 153-160. "Nov./Dec. 1951" [28 March 1952]. Annotated list of about 120 spp.

Condamin, M., "Mission A. Villiers au Togo et au Dahomey (1950). X. Lépidoptères Rhopalocères" [in French]. *Bull. Inst. franç. Afr. Noire,* vol. 14: pp. 170-183. "Jan." [Mar.] 1952. Records 97 spp. and forms; gives known distribution of each. Covers butterflies except Pieridæ, Lycænidæ, Hesperiidæ. [P.B.]

Cotterell, G. S., "Notes on insects injurious to crops in Afghanistan." *FAO Plant Protect. Bull.*, vol. 2: pp. 53-55. Jan. 1954. Records of 11 economically important Lepidoptera.

Daniel, Franz, & Josef Wolfsberger, "Beiträge zur Kenntnis der Lepidopteren-Fauna des Oberinntales (Vorbericht)" [in German]. *Nachrbl. Bayer. Ent.*, vol. 2: pp. 49-51. 15 July 1953. Annotated list.

Droit, P. A., "Notes de chasse dans la zone du bassin moyen de la Durance" [in French]. *Rev. franç. Lépid.*, vol. 13: pp. 103-111. "Sept./Oct." [28 Dec.] 1951. Annotated list of about 60 butterflies; names an aberration of *Erebia*. [P.B.]

Dufay, C., "Notes lépidoptérologiques" [in French]. *Bull. Mens. Soc. Linn. Lyon,* vol. 22: pp. 109-112, 6 figs. 1953. *Cryphia lusitanica* new for the French fauna with indications of some interesting species of Agrotidæ. [P.V.]

Ernst, R., "*Anomogyna rhætica* Stgr. ssp. *norica* Löberb. (Nachweis für Niederösterreich)" [in German]. *Zeits. Wiener Ent. Ges.*, vol. 37: p. 185. 31 Dec. 1952. New record.

Esaki, Teiso, & Takashi Shirôzu, [A tentative list of the butterflies of Japan, with notes and a synoptic table of life histories of each species] [in Japanese]. *Shin Konchu,* Special No. (vol. 4, no. 9): 117 pp., num. figs. Aug. 1951.

Feichtenberger, Erich, "Ergänzungen zum Aufsatz Hans Foltin: *Biston (Pœcilopsis) isabellæ* Harr." [in German]. *Zeits. Wiener Ent. Ges.*, vol. 34: pp. 133-134. 15 Sept. 1949. Distribution.

Foltin, Hans, "*Parnassius mnemosyne* L. Verbreitung der Subspec. *batavus* Fruhst. in Oberösterreich. Grundsätzliches zur Systematik und Nomenklatur" [in German]. *Zeits. Wiener Ent. Ges.*, vol. 33: pp. 88-91. 1 Nov. 1948. Distribution in Austria; discussion of forms and related subspecies. [P.B.]

Galvagni, Egon, "Nachlese zu den 'Bausteinen zur Kenntnis der Schmetterlingsfauna der niederösterreichischen Zentralalpen' " [in German]. *Zeits. Wiener Ent. Ges.*, vol. 34: pp. 19-24. 1 Feb. 1949. Records of Microlepidoptera from Payerbach region in Austria. [P.B.]

Galvagni, Egon, "Nachlese zu den 'Bausteinen zur Kenntnis der Schmetterlingsfauna der niederösterreichischen Zentralalpen' " [in German]. *Zeits. Wiener Ent. Ges.*, vol. 34: pp. 78-84. 15 May 1949. Extensive annotated list, mostly Microlepidoptera. [P.B.]

Gauckler, Konrad, "An den Grenzen der Verbreitung der *Zygæna fausta* und ihrer Nährpflanzen in Franken und in der Oberpfalz" [in German]. *Nachrbl. Bayer. Ent.*, vol. 1: pp. 41-44, 1 fig. 15 June 1952. Discusses the distribution of the species and the foodplants of the larva. [N. O.]

Glaser, Wolfgang, "*Arctia flavia* Fuessl. in Salzburg" [in German]. *Zeits. Wiener Ent. Ges.*, vol. 33: p. 136. 1 Dec. 1948.

Gottschlich, Fr. A., "Kärntner Beobachtungen und Ergebnisse in den Jahren 1947-48" [in German]. *Zeits. Wiener Ent. Ges.*, vol. 34: pp. 33-35, 1 pl. 15 May 1949. Records of butterflies and moths from Carinthia. [P.B.]

Gradl, Franz, "*Arctia flavia* Fuessly, 'der Engadiner-Bär' in den Urgesteinsalpen Vorarlbergs" [in German]. *Zeits. Wiener Ent. Ges.*, vol. 35: pp. 22-25. 20 March 1950. Range extension of this alpine sp. and some other records from Vorarlberg. [P.B.]

Gremminger, A., "*Parastichtis (Hadena) secalis* f. *struwei* Rag." [in German]. *Nachrbl. Bayer. Ent.*, vol. 1: p. 72. 15 Sept. 1952. Recorded in Baden. [N.O.]

Gremminger, A., "A propos de la répartition d'*Erebia nerine* Frr." [in French]. *Bull. Soc. Ent. Mulhouse,* June 1953: pp. 44-46. 1953.

Griewisch, Louis, "*Lycæides argyrognomon* in Wisconsin." *Lepid. News,* vol. 7: p. 54. 29 July 1953.

Grönblom, Thorwald, & Esko Suomalainen, "Über das Vorkommen der Nonne, *Lymantria monacha* L. (Lep., Lymantriidæ), in Finland" [in German]. *Ann. Ent. Fennici,* vol. 16: pp. 178-181, 1 map. Dec. 1950.

Hackray, Jos., "Étrange disparition du *Colias palæno* dans les Hautes Fagnes" [in French]. *Lambillionea,* vol. 51: pp. 65-68. 25 Dec. 1951. Blames disappearance of species on succession of dry years with no protective snow cover in winter. [P.B.]

Hackray, J., "Découverte de la chenille de *Boloria aquilonaris* Stichel en Belgique" [in French]. *Lambillionea,* vol. 53: pp. 69-71. 1954. Discovery of the larvæ of *B. aquilonaris* Stichel (Nymphalidæ) in Belgium. Bibliographical references incomplete. [P.V.]

Haggett, G., "Autumnal moth larvæ at Arundel, 1951." *Entomologist,* vol. 84: pp. 276-277. Dec. 1951.

Hansslmar, Oskar, "*Neptis aceris* Lepech" [in German]. *Zeits. Wiener Ent. Ges.*, vol. 32: p. 149. 30 July 1948. Capture near Vienna suggests a westward movement of this eastern species. [P.B.]

Harrison, J. W. Heslop, & J. K. Morton, "Lepidoptera in the isles of Raasay, Rhum (v.-C. 104), Lewis, and Harris (v.-c. 110) in 1951." *Entomologist*, vol. 85: pp. 6-13. Jan. 1952.

Hart, Robert, "Butterfly collecting in the Blue Mountains." *Nat. Hist. Notes Nat. Hist. Soc. Jamaica*, nos. 35/36: pp. 194-195. Dec. 1948.

Heinänen, V. L., "Altes und neues über *Malacodea regelaria* Tgstr. (Lep., Geometridæ)" [in German]. *Ann. Ent. Fennici*, vol. 16: pp. 188-200, 9 figs., 1 map. Dec. 1950. Reports the first find of the female of this species in Finland. Summarizes all known records from northern Europe. [W.H.]

Hellman, E. A., "The occurrence of different forms of the moth *Tæniocampa gothica* L. (Lep., Noctuidæ) in different parts of Finland" [in Finnish, English summary]. *Ann. Ent. Fennici*, vol. 16: p. 93. Aug. 1950.

Helsingin Hyönteisvaihtoyhdistys (Helsingfors Entomologiska Bytesförening), ed., *Enumeratio insectorum Fenniæ et Sueciæ. I. Lepidoptera. 2. Microlepidoptera.* Helsingfors, 1950. A catalogue of the Microlepidoptera of Finland and Sweden (with short explanation in Finnish, Swedish and English). The relative frequency and abundance of the species is indicated by numbers. Published by a society for exchange of insects in Finland. [W.H.]

Herbulot, C., & P. Viette, "Lépidoptères récoltés par MM. A. Reymond et F. Pierre dans la région de Beni-Abbès (Sahara Algérien)" [in French]. *Rev. franç. Lépid.*, vol. 13: pp. 89-96. "May/June" [10 Aug.] 1951. Annotated list of 46 spp. in 13 families.

Herbulot, Cl., "Captures d'*Eupithecia* faites à Buré (Meurthe et Moselle)" [in French]. *Lambillionea*, vol. 52: pp. 51-55. 25 Oct. 1952. Local list of 31 spp., with notes on general distribution of some. [P.B.]

Heuser, Rudolf, "Eine zweite Form von *Zygæna transalpina* Esp. *astragali* Bkh. in der Rheinpfalz" [in German]. *Nachrbl. Bayer. Ent.*, vol. 2: pp. 63-64. 15 Aug. 1953. New record for the area; observations. [N.O.]

Hoffmann, Emil, "*Arctia flavia* Fuessl. in Salzburg" [in German]. *Zeits. Wiener Ent. Ges.*, vol. 34: p. 14. 1 Feb. 1949.

Hoffmann, Emil, "Verzeichnis der von Herrn Johann Praniess aus der Gegend von Abtenau in Salzburg gesammelten Macrolepidopteren" [in German]. *Zeits. Wiener Ent. Ges.*, vol. 33: pp. 25-33, 1 fig. 20 March 1950. Annotated list of some 290 spp. in 23 families; names an aberration of *Parnassius mnemosyne.* [P.B.]

Homberg, R., "Contribution à la faune des Hétérocères de la Sologne" [in French]. *Rev. franç. Lépid.*, vol. 13: pp. 28-32, 34-38. "Jan.-Feb." [31 Mar.], "Mar.-Apr." [31 July] 1951. Annotated list of the more unusual records. Omission of family names and indication of genera by initial only reduces the usefulness of this list for workers not familiar with the European fauna. [P.B.]

Hopf, Hans, "Lichtfang in Mürren (Berner Oberland) im Jahre 1950 (Lepidoptera)" [in German]. *Ent. Nachrbl.*, vol. 3: pp. 189-190. Oct./Nov. 1951 List of Noctuidæ and Geometridæ taken, mostly at light. [P.B.]

Jackson, R. A., "Some Lepidoptera of a Hampshire marsh." *Entomologist*, vol. 85: pp. 105-107. May 1952. Macroheterocera.

Janmoulle, E., Espèces nouvelles pour la faune belge" [in French]. *Lambillionea*, vol. 52: pp. 13, 25-26, 49-50. 25 April, 25 June, 25 Oct. 1952. *Philedone prodromana, Coleophora glaucicolella, C. pallorella, C. suædivora, C. artemisiella, C. clypeiferella, Semasia tripoliana, Phthorimæa salicorniæ.*

Janmoulle, E., "Espèces nouvelles pour la faune belge" [in French]. *Lambillionea*, vol. 53: pp. 21-22. 1953. *Pamene obscurana, Hemimene politana, H. cinerosana.*

Kaisila, Jouko, "Siivekkäät apollomme" [in Finnish]. *Suomen Luonto*, vol. 7: pp. 34-44, 3 figs., 2 maps. 1948. Half popular article on *Parnassius apollo* in Finland. [W.H.]

Kaisila, Jouko, "Insects from arctic mountain snows." *Ann. Ent. Fennici*, vol. 18: pp. 8-25, 3 figs. 1 table. June 1952. Reports among other insects 29 species of Lepidoptera found on mountain snow in Finnish Lapland. [W.H.]

Kasy, Fritz, "*Hyphantria textor* Harr. im Wiener Gebiet" [in German]. *Ent. Nachrbl.*, vol. 3: p. 170. Oct./Nov. 1951. Records of this introduced species near Vienna. [P.B.]

Koch, Manfred, "Lichtfang mit der Höhensonne II" [in German.] *Zeits. Wiener Ent. Ges.*, vol. 32: pp. 60-69, 116-121. 10 May, 30 June 1948. Macroheterocera taken at light in 1946. [P.B.]

Kozhanchikov, I. V., "The cycle of development and the geographical distribution of the winter moth *Operophtera brumata* L." [in Russian]. *Ent. Obozr.*, vol. 31: pp. 178-197, 1 map. 1950. [Not seen.]

Krogerus, Harry, "*Chloroclystis coronata* Hb., ett tillskott till Finlands fjärilfauna" [in Swedish]. *Notul. Ent.*, vol. 28: pp. 127-128. Apr. 1949. Species new to Finland. [W.H.]

Kurentsov, A. I., "Concerning the zoogeographical division of the Amur River region" [in Russian]. *Dokl. Akad. Nauk SSSR*, vol. 66: pp. 503-505. 1949.

Kusnezov, N., "*Atticonviva* Busck en la Argentina" [in Spanish, German summary]. *Acta Zool. Lilloana*, vol. 10: pp. 281-282. 1952. Reports larvæ of this ant guest species from Argentina, in nests of *Acromyrmex lobicornis*. [P.B.]

de Laever, E., "Espèces nouvelles pour la faune belge" [in French]. *Lambillionea*, vol. 52: pp. 3-5, 3 figs. 25 Feb. 1952. *Lycæides argyrognomon;* figures uncus of this species and of *L. idas*. [P.B.]

de Laever, E., "Espèces nouvelles pour la faune belge" [in French]. *Lambillionea*, vol.52:pp.62-65. 14 Feb. 1953. *Perizoma bifasciata, Diastichtis artesaria, Eupithecia laquæaria, E. extraversaria.*

de Laever, E., "*Plebeius idas* L. en Belgique" [in French]. *Lambillionea*, vol. 53: p. 64. 1953.

de Laever, Ed., "Un *Leucania* nouveau pour la faune française" [in French]. *Rev. franç. Lépid.*, vol. 13: pp. 282-283, 1 pl. "Oct./Nov./Dec. 1952" 25 March 1953. Records *L. alopecuri*; figures adults and ♂ genitalia of this and related spp. [P.B.]

de Laever, E., "*Selidosema plumaria* (Schiffermüller) en France" [in French]. *Rev. franç. Lépid.*, vol. 14: pp. 10-11. 1953.

de Laever, E., "*Caradrina* (*Paradrina*) *noctivaga* bonne espèce en France" (Noctuidæ)" [in French]. *Rev. franç. Lépid.*, vol. 14: pp. 29-30, 1 fig. 1953.

Lambremont, Edward Nelson, "The butterflies and skippers of Louisiana." *Tulane Stud. Zool.*, vol. 1: pp. 127-164, 3 figs. 30 April 1954. Annotated list of 98 spp., and list of 39 more to be expected. [P.B.]

Le Marchand, S., "*Borkhausenia cinnamomea* Zeller (Microlépidoptères Œcophoridæ) est bien une espèce française" [in French]. *Rev. franç. Lépid.*, vol. 13: p. 252. "May/June/Sept." [15 Nov.] 1952. Authentic French record.

de Lesse, H., "Contribution à l'étude du genre *Erebia* (6me note). Notes de répartition et nouvelles indications sur *E. eriphyle* (Frr.) et *E. stirius* (Godt.) récemment signalés en France" [in French]. *Rev. franç. Lépid.*, vol. 13: pp. 130-137, 1 fig. "Nov./Dec. 1951" [28 March 1952]. Distribution of these and other spp. of *Erebia* in France. Figures *E. stirius styx*. [P.B.]

de Lesse, H., "Contribution à l'étude du genre *Erebia* (8e note). Répartition de *E. euryale isarica* Heyne et *E. euryale adyte* (Hb.) dans les Alpes françaises" [in French]. *Rev. franç. Lépid.*, vol. 13: pp. 226-228, 1 map. "May/June/Sept." [15 Nov.] 1952.

de Lesse, H., "Contribution à l'étude du genre *Erebia.* Repartition de *E. tyndarus* Esp. et *E. cassioides* R. et Hohnw. dans la partie occidentale du Valais (Lep. Satyridæ)" [in French]. *Entomologiste*, vol. 8: pp. 65-70, 1 map. "1952" [1953]. Repartition and distinction of *E. tyndarus* and *E. cassioides* in the occidental part of the Valais (Switzerland). [P.V.]

de Lesse, H., "Contribution à l'étude du genre *Erebia* (10e note)" [in French]. *Lambillionea*, vol. 53: pp. 5-11, 1 map. 1953. Geographical repartition of *E. cassioides* and *E. hispania* in Spain and in the Pyrenees. [P.V.]

Lever, R. J. A. W., "New insect pest records in the British Solomon Islands." *Agric. Journ. Fiji*, vol. 19: pp. 50-52, 3 figs. June 1948. Records *Sylepta derogata, Sesamia* sp., *Pyrausta salentialis, Heliothis armigera, Prodenia litura, Hymenia fascialis,* all new to the Islands, with their foodplants. [P.B.]

Lindenbauer, Mauritz, "*Neptis aceris* Lepech." [in German]. *Zeits. Wiener Ent. Ges.*, vol. 34: pp. 72-73. 15 May 1949. Distribution and phenology in Austria.

Lindenbauer, Mauritz, "Kurze Mitteilung" [in German]. *Zeits. Wiener Ent. Ges.*, vol. 34: p. 165. 31 Dec. 1949. *Ochrostigma melagona,* new to Steiermark. [P.B.]

Lindenbauer, Mauritz, "Nachtrag und Ergänzung zu meinem Aufsatz '*Neptis aceris* Lepech.' " [in German]. *Zeits. Wiener Ent. Ges.*, vol. 34: pp. 165-166. 31 Dec. 1949.

Lomakina, M. I., & V. I. Medvedeva, "American white butterfly" [in Russian]. *Sad i Ogorod*, vol. 10: p. 76 Oct. 1952. *Hyphantria cunea;* not in Russia. [not seen.]

de Lucca, C., "Further notes on Lepidoptera Heterocera from Malta." *Ent. Mon. Mag.*, vol. 85: p. 191. July 1949.

Lukasch, H., "Interessante Pyraliden (Microlepidopt.) aus Franken" [in German]. *Nachrbl. Bayer. Ent.*, vol. 1: p. 47. 15 June 1952. *Chloridea maritima* and *Parastichtis secalis* f. *struvei* new for S. Germany. [N.O.]

Martynova, E. F., "Special features of the lepidopterous fauna of the southern Ural area and its importance for steppe silviculture" [in Russian]. *Trudy Zool. Inst. Akad. Nauk SSSR*, vol. 11: pp. 66-91. 1952. [Not seen.]

van der Meulen, G. S. A., "Zeldzame en nieuwe Lepidoptera" [in Dutch, English summary]. *Ent. Berichten*, vol. 15: p. 27. 1 Feb. 1954.

Mather, Bryant, "Additional notes on the Harvester Butterfly — *Feniseca tarquinius* (Fabricius)." *Maryland Nat.*, vol. 22: p. 52. 1952. Includes record for Mississippi. [C.R.]

Metzky, Witburg, "Richtlinien für eine Bearbeitung der Lepidopteren-Fauna von Niederösterreich" [in German]. *Zeitschr. Wiener Ent. Ges.*, vol. 33: pp. 3-13. 1 Oct. 1948. Outline of a projected cooperative work on the Austrian fauna. [P.B.]

Moucha, J., "*Pieris* (*Artogeia*) *manni* Mayer in Mitteleuropa" [in German]. *Ent. Nachrbl.*, vol. 5: pp. 10-12. Jan./Feb. 1953. Gives 3 records from Slovakia and mentions earlier information on distribution, with associated fauna. [P.B.]

Moucha, Josef, "The Fall Webworm (*Hyphantria cunea*) in Europe." *Lepid. News*, vol. 7: p. 55, 1 fig. 29 July 1953.

Moul, Edwin T., "Preliminary report on land animals at Onotua Atoll, Gilbert Islands." *Atoll Research Bull.*, no. 28: 28 pp. 31 May 1954. Records a few Lepidoptera, including *Hypolimnas bolina, Precis villida,* a hesperiid, and some moths. The impoverished land fauna is estimated at only 80 spp. of invertebrates. [P.B.]

Nabokov, Vlandimir, "Butterfly collecting in Wyoming, 1952." *Lepid. News*, vol. 7: pp. 49-51. 29 July 1953.

Nonveiller, G., "*Hyphantria cunea* Drury, un nouveau problème d'importance internationale en Europe" [in French]. *Trans. 9th Int. Congr. Ent.*, vol. 1: pp. 669-671, March 1953. The Fall Webworm from North America is observed in mass occurrence in Hungary and is rapidly extending ever since over the whole of that country to Yugoslavia and Czechoslovakia. Joint control measures by European countries are proposed. [A.D.]

Nordman, Adolf Fr., "The significance for insects of climatic changes." *Fennia*, vol. 75: pp. 60-68, 1 map. 1952. Deals mainly with the Macrolepidoptera in Finland, and analyzes the effect of the various climatic factors on their frequency fluctuations. [W.H.]

Overlaet, F. G., "Espèces nouvelles pour la faune belge" [in French]. *Lambillionea*, vol. 51: p. 33. 25 Aug. 1951. *Boarmia maculata bastelbergeri.*

Pfister, Hermann, "Interessante Pyraliden (Microlepidopt.) aus Franken" [in German]. *Nachrbl. Bayer. Ent.*, vol. 1: pp. 87-88. 15 Nov. 1952. Annotated list.

Pfister, H., "Beobachtungen an einigen in Bayern vorkommenden Pterophiden (Lep.)" [in German]. *Nachrbl. Bayer. Ent.*, vol. 2: pp. 44-47. 15 June 1953. Annotated list of 19 spp. [N.O.]

Pfister, Hermann, "Begegnungen mit *Pamene herrichiana* Hein." [in German]. *Nachrbl. Bayer. Ent.*, vol. 2: pp. 81-82. 15 Nov. 1953. New localities for S. Bavaria and Oberfranken. [N.O.]

Plantrou, J., "A propos de la répartition de *Limenitis rivularis* Scopoli (Nymphalidæ) en Haute-Normandie" [in French]. *Rev. franç. Lépid.*, vol. 13: pp. 223-224. "March/April" [25 July] 1952. Possible extension of range. [P.B.]

de Puységur, K., "Plus de neuf cents sujets de *Libythea celtis* Fuessly récoltés (chenilles et chrysalides) ou capturés (imagos) dans l'Hérault en huit ans" [in French]. *Rev. franç. Lépid.*, vol. 14: pp. 8-10. 1953. Note on the capture of more than 900 specimens of *Libythea celtis* in 8 years. [P.V.]

de Puységur, K., "Quelques observations sur *Hamæaris lucina* Linné (Riodinidæ Hamæarinæ)" [in French]. *Rev. franç. Lépid.*, vol. 14: pp. 47-49. 1953.

Rambold, Alois, "*Lymantria monacha* L. f. *eremita* O. und f. *nigra* Frr." [in German]. *Nachrbl. Bayer. Ent.*, vol. 3: p. 8. 15 Jan. 1954.

Reid, W. J., Jr., & C. O. Bare, "Seasonal populations of cabbage caterpillars in the Charleston, S. C., area." *Journ. Econ. Ent.*, vol. 45: pp. 695-699, 1 fig. Aug. 1952. Phenology of *Trichoplusia ni, Plutella maculipennis, Pieris rapæ, Hellula undalis,* and some noctuids, over 4 years. [P.B.]

Reisser, Hans, "Neue oder bemerkungswerte Falterfunde aus dem Bergenland und aus Niederösterreich" [in German]. *Zeits. Wiener Ent. Ges.*, vol. 34: pp. 141-146. 31 Dec. 1949. Annotated list of 84 spp.

Risbec, J., "Notes relatives à la communication 49 de la première conférence internationale des africanistes de l'ouest: 'État actuel des recherches entomologiques agricoles dans la région correspondant au secteur soudanais de recherches agronomiques' " [in French]. *Bull. Inst. franç. Afr. Noire,* vol. 12: pp. 542-545. Apr. 1950. List of determinations of noxious insects. [P.B.]

Roepke, W. K. J., "*Appias* en *Delias* uit Indonesie (Lep.)" [in Dutch, English summary]. *Ent. Berichten,* vol. 15: p. 26. 1 Feb. 1954.

Roivainen, H., "A collection of Macrolepidoptera from Ulkokrunni" [in Finnish, English summary]. *Ann. Ent. Fennici,* vol. 19: pp. 25-29 March 1953. A list of the Macrolepidoptera of an isolated island in the Bothnian Gulf. [W.H.]

Ronniger, Hermann, "Als Sammler von Microlepidopteren rund und den Traunstein" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 31: pp. 130-147. 15 Mar. 1948. Description of area and annotated list of 203 spp. [P.B.]

Salo, Eino, & Olavi Sotavalta, "The macrolepidopterous fauna of the parish of Lempäälä (EH). Part I." [in Finnish, English summary]. *Ann. Ent. Fennici,* vol. 18: pp. 84-133. Nov. 1952. Extensive local list of Macrolepidoptera from central Finland. [W.H.]

Sattler, Klaus, "Die Ausbreitung des Lindenschwärmers (*Dilina tiliæ* L.) in Schleswig" [in German]. *Mitt Faun. Arbeitsgem. Schleswig-Holstein,* vol.6: pp.45-46. 1953. Local dist.

von Schantz, Max, & Henrik Bruun, "Lepidopterologiska iakttagelser i nordvästra Enontekis (Le) 1946-48" [in Swedish]. *Notul. Ent.,* vol. 31: pp. 109-118, 1 map, 1 table. Dec. 1951. A list of Lepidoptera from northwestern Finnish Lapland. [W.H.]

Scott, Hugh, "Journey to the Gugli highlands (southern Ethiopia) 1948-9; biogeographical research at high altitudes." *Proc. Linn. Soc. London,* vol. 163: pp. 85-189, 26 pls., 7 figs. 14 Nov. 1952. Includes mention of some Lepidoptera; references scattered, but an index is provided. [P.B.]

Shtandel', A. E., "On the unexpected discovery of eastern Siberian butterfly species in Kuzbas" [in Russian]. *Priroda,* vol. 40, no. 4: p. 69. Apr. 1951. [Not seen.]

Simmonds, F. J., "The small moth-borers of sugar cane, *Diatræa* spp., in Trinidad." *Trop. Agric.,* vol. 28: pp. 80-108, 1 map. Jan./June 1951. Occurrence and parasites of 3 spp. [P.B.]

Sjöholm, Emil, "Till kännedomen om Jakobstads-traktens macrolepidopterfauna" [in Swedish]. *Notul. Ent.,* vol. 29: pp. 64-79, 1 map. March 1950: Lists 386 spp. of Macrolepidoptera from the Jakobstad region in Finland. [W.H.]

Smith, Kenneth G. V., "Notes on the Macrolepidoptera of central Shropshire, 1948-1951" *Entomologist,* vol. 85: pp. 25-32. Feb. 1952.

Smith, Marion E., "More butterflies from Alaska and the highway." *Lepid. News,* vol. 7: pp. 123-126. 5 Nov. 1953.

Stadler, Hans, "Die Kleinschmetterlinge von Unterfranken" [in German]. *Nachrbl. Bayer. Ent.,* vol. 2: pp. 78-79. 15 Oct. 1953. 10 spp. new to the area. [N.O.]

Stempffer, H., "Contribution à l'étude de l'Aïr. (Mission L. Chopard et A. Villiers). Lépidoptères Lycænidæ" [in French]. *Mém. Inst. franç. Afr. Noire,* no. 10: pp. 167-270. 12 Dec. 1950. Annotated list of 6 spp.

Stempffer, H., "Mission A. Villiers au Togo et au Dahomey (1950). XI. Lépidoptères Lycænidæ." [in French]. *Bull. Inst. franç. Afr. Noire,* vol. 14: pp. 186-190. "Jan." Mar. 1952. Records 33 spp.; gives known distribution of each. [P.B.]

Sterzl, Otto, "Zur Lepidopterenfauna des Waldviertels. Neue oder Bemerkungswerte Funde in der Umgebung von Artbesbach (Niederösterreich)" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 38: pp. 3-6. 1 March 1953. Notes and new records from this area; butterflies and a few Noctuidæ and *Larentia.* [P.B.]

Suomalainen, Esko, "Neueres über das Vorkommen der Nonne, *Lymantria monacha* L. (Lep., Lymantriidæ) in Finnland" [in German]. *Ann. Ent. Fennici,* vol. 19: pp. 52-56. June 1953.

Thurner, Josef, "Ein weiterer Beitrag zur Falterfauna Nordtirols" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 34: pp. 73-77. 15 May 1949. Annotated list of 106 spp.

Tilden, J. W., "Range extension of *Pholisora libya* Scudder." *Pan-Pacific Ent.,* vol. 28: p. 92. 1952. Range extended from Mohave Desert across San Joaquin Valley to Coalinga, Calif. [J.T.]

Valletta, Anthony, "Recent additions to the known Lepidoptera (Heterocera) of the Maltese Islands." *Entomologist,* vol. 84: pp. 255-257. New records are 6 noctuids, 4 geometers, 6 pyralids, 1 pterophorid, 1 œcophorid, 1 tineid. [P.B.]

Various authors, *Annual Report of the Forest Insect and Disease Survey, 1951.* 154 pp., maps. Department of Agriculture, Canada. 1952. Discusses forest insects by provinces. Distribution records for many spp. of Lepidoptera. [P.B.]

Various authors, *Annual Report of the Forest Insect and Disease Survey, 1953.* 158 pp., maps. Ottawa: Dept. of Agriculture, Canada, 1954. Contains a wealth of information on the distribution and abundance of noxious Lepidoptera, with records of many parasites. [P.B.]

Viette, P., "Note sur Madagascar" [in French]. *Rev. franç. Lépid.,* vol. 13: pp. 272-281, 3 pls. "Oct./Nov./Dec. 1952" [25 March 1953]. General account of geography and vegetation of the island, with some mention of the fauna. [P.B.]

Viette, P. E. L., "Lépidoptères récoltés aux îles Gilbert (Pacifique centrale)" [in French]. *Ann. Soc. Ent. France,* vol. 122: pp. 123-130. "1953" [1954]. Study of a collection made recently in the Gilbert Islands. [P.V.]

Vigneau, P., "Note sur la repartition géographique de *Gortyna leucostigma* Hb. et *Araschnia levana* Lin." [in French]. *Rev. franç. Lépid.,* vol. 14: p. 46. 1953.

Villiers, A., "Contribution à l'étude de l' Aïr. (Mission L. Chopard et A. Villiers). Lépidoptères Danaidæ et Nymphalidæ" [in French]. *Mém. Inst. franç. Afr. Noire,* no. 10: p. 268. 12 Dec. 1950. Annotated list: 1 danaid, 5 nymphalids.

Vintejoux, Max. "Captures de Geometridæ en Corrèze" [in French]. *Rev. franç. Lépid.,* vol. 13: p. 297. "Oct./Nov./Dec. 1952" [25 March 1953]. Records of 8 spp. new to the area. [P.B.]

Warnecke, G., "*Larentia multistrigaria* Haw., eine lusitanisch-atlantische Geometride, in Mitteleuropa" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 33: pp. 38-41, 1 map. 1 Oct. 1948.

Warnecke, Georg, "Tierwelt" [in German]. *In* Koehn, *Die Nordfriesische Inseln* (Verlag Cram, de Gruyter u. Co., Hamburg): pp. 61-82, pls. 53-63. 1954. Description of animal life, including Lepidoptera, of the North Friesian Islands, with two superb black and white plates of representative species. [C.R.]

van Wisselingh, T. H., "Macrolepidoptera in 1951" [in Dutch]. *Verslag 84ste Wintervergad. Nederl. Ent. Vereen.,* pp. xciv-xcvii. 15 Dec. 1952. Gives a survey of rare captures and records *Eriopus juventina* as new for Dutch fauna. [A.D.]

van Wisselingh, T. H., "Macrolepidoptera in 1952" [in Dutch]. *Ent. Berichten,* vol. 15: pp. 17-20. 1 Feb. 1954. Survey of Macrolepidoptera collected in 1952 in Holland. [A.D.]

Witzmann, Johann, "Beitrag zur Lepidopterenfauna von Salzberg" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 38: pp. 30-31. 1 March 1953. 16 unusual records (butterflies, Noctuidæ, *Lobophora, Arctia*). [P.B.]

Wolfsberger, Josef, "Biologische und ökologische Beobachtungen am Fundort von *Rebelia bavarica* Wehrli (Lep. Psychid.)" [in German]. *Nachrbl. Bayer Ent.,* vol. 1: pp. 4-6. 15 Jan. 1952. Habits, phenology, distribution. [N.O.]

Wolfsberger, Josef, "Einige interesante Macrolepidopterenfunde aus den Stubaier Alpen (Nordtirol)" [in German]. *Nachrbl. Bayer. Ent.,* vol. 1: pp. 54-55, 71-72, 75-78. 15 July, 15 Sept., 15 Oct. 1952. Annotated list of the most interesting records; new localities for the area. [N.O.]

Wolfsberger, Josef, "Die Verbreitung von *Agrotis* (*Opigena*) *polygona* F. in den Bayerischen und den angrenzenden nördlichen Kalkalpen (Lep. Noct.)" [in German]. *Nachrbl. Bayer. Ent.,* vol. 1: pp. 89-91, 1 map. 15 Dec. 1952.

Wolfsberger, Josef, "*Harmodia tephroleuca* Bsd. und *Anaitis simpliciata* Tr. in den Astalpen (Lep. Noct. u. Geom.)" [in German]. *Nachrbl. Bayer. Ent.,* vol. 2: pp. 58-60. 15 Aug. 1953.

Wolfsberger, Josef, "Bemerkenswerte Flugzeiten einiger Lepidopteren im Hochgebirge" [in German]. *Nachrbl. Bayer. Ent.,* vol. 2: pp. 73-75. 15 Oct. 1953. Phenological observations in N. Tirol. [N.O.]

Wolfsberger, Josef, "Neue und interessante Macrolepidopterenfunde aus Südbayern und den angrenzenden nördlichen Kalkalpen (3. Beitrag zur Kenntnis der Fauna Südbayerns)" [in German].*Nachrbl. Bayer. Ent.* vol. 2: pp. 5-7, 13-21. 15 Dec. 1953; 15 Jan., 15 Feb. 1954. Annotated list of localities and spp. new to the area. [N.O.]

de Worms, C. G. M., "A week's collecting in Denmark, June to July, 1950." *Entomologist,* vol. 84: pp. 221-225. Oct. 1951.

de Worms, C. G. M., "Notes on British Lepidoptera collecting during 1951." *Entomologist,* vol. 85: pp. 78-82, 112-117. Apr., May 1952.

Zivojinović. S., "La faune des insectes du domaine forestier de Majdanpek" [in Slavic, French summary]. *Monogr. Acad. Serbe Sci.,* vol. 160: vii 262 pp., 20 pls., 1 map. Includes annotated list of insect fauna, with 266 spp. of Lepidoptera, and more detailed notes on some noxious spp., including 21 Lepidoptera. [P.B.]

G. PHYSIOLOGY AND BEHAVIOR

Anderson, Ann D., & R. L. Patton, "Determination of xanthine oxidase in insects with tetrazolium salts." *Science,* vol.120: p.956. 3 Dec. 1954. Including *Prodenia eridania.*

Auclair, Jacques L., "Amino acids in insects." *Canad. Ent.,* vol.85: pp.63-68. 11 March 1953. Discusses aspects of amino acid structure and metabolism in *Galleria mellonella, Prodenia eridania,* and some other insects. [E.M.]

Baldwin, W. F., & H. L. House, "Factors influencing the specific gravity of insect hemolymph." *Canad. Ent.,* vol.84: pp.131-139, 2 figs. 31 May 1952. Discusses effects of wilted foliage, parasitization, and high temperatures on specific gravity of sawfly hemolymph. Describes apparatus for determining specific gravity. Records specific gravity of hemolymphs of 5 spp. of Lepidoptera. [E.M.]

Butenandt, Adolf, et al, "Uber Ommochrome" [in German]. *Liebigs Ann. Chem.,* vol.586: pp.217-228, 229-239; vol.588:pp.106-116; vol.590: pp.75-90. 1954. Extraction of Xanthommatin and related pigments of *"Vanessa" urticæ,* and determination of structure of Xanthommatin. [P.B.]

Fox, H. Munro, "The colours of animals." *Endeavour,* vol.14: pp.40-47, 4 pls. Jan. 1955. Account of structural and chemical basis of animal color, referring to a few Lepidoptera. [P.B.]

Good, M. E., F. O. Morrison, & E. Mankiewicz, "Lipidolytic enzymes extracted from *Galleria mellonella* L. (Lepidoptera: Pyralidæ) reared on natural and artificial media." *Canad. Ent.,* vol.85: pp.252-253. 23 July 1953. Differences in appearance and specific lipolytic activity of whole blends of larvæ fed respectively on synthetic wax-free media and on natural diets are noted. [E.M.]

Kikkawa, H., Z. Ogita, & S. Fujito, "Nature of pigments derived from tyrosine and tryptophan in animals." *Science,* vol.121: pp.43-47. 14 Jan. 1955. Suggests that these pigments are metallic complex salts; some evidence from study of *Bombyx mori* mutants. [P.B.]

Mercer, E. H., " A note on the digestion of wool by clothes-moth larvæ." *Biochem. Biophys. Acta,* vol.15: pp.293-295, 3 figs. Oct. 1954.

Nayar, K. K., "Metamorphosis in the integument of caterpillars with omission of the pupal stage." *Proc. Roy. Ent. Soc. London (A),* vol.29: pp.129-134, 4 figs. 31 Dec. 1954. Metamorphosis of larval skin transplanted to pupa demonstrated in *Ephestia, Galleria,* and *Pieris.* [P.B.]

Nickerson, B., "Insect pigments and coloration." *Science News,* no.34: pp.85-94. Nov. 1954. Popular account.

Powning, R. F., "A study of cysteine desulphydrase in certain insects." *Austral. Journ. Biol. Sci.,* vol.7: pp.308-318, 4 figs. Aug. 1954. Including *Tineola bisselliella.*

Salt, R. W., "The influence of food on cold hardiness of insects." *Canad. Ent.,* vol.85: pp.261-269. 23 July 1953. Cold hardiness of *Agrotis orthogonia* and *Ephestia kuehniella* larvæ is shown to be much less during feeding than during non-feeding periods before and after molting. This is attributed to the relatively high temperature at which food in the gut freezes, whereupon it inoculates freezing in the insect tissues. [E.M.]

Shappirio, David G., "The cytochrome system of the Cecropia silkworm in relation to diapause and adult development." *Anat. Rec.,* vol.120: pp.731-732. Nov. 1954. Abstract only.

Smith, Roger D., & Howard A. Schneiderman, "The healing of epidermal wounds in diapausing pupæ of the silkworm." *Anat. Rec.,* vol.120: pp.724-725. Nov. 1954. *Platysamia cecropia;* abstract only.

Sullivan, C. R., & W. G. Wellington, "The light reactions of larvæ of the tent caterpillars, *Malacosoma disstria* Hbn., *M. americanum* (Fab.), and *M. pluviale* (Dyar). (Lepidoptera: Lasiocampidæ)." *Canad. Ent.,* vol.85: pp.297-410. 16 Sept. 1953. At room temperatures larvæ of all 3 spp. are photopositive to point or diffuse sources; starvation intensifies the response. Overheated larvæ of *M. disstria* and of first 3 instars of the other 2 spp. become photonegative to diffuse light. Late instars of *M. americanum* and *M. pluviale* become more strongly photopositive, a response associated with abandonment of the overheated tent. Older larvæ traveling on the ground go towards the sun when cool, parallel to it when warmer, away from it when hot. The apparent inconsistency in behavior of older larvæ of *M. pluviale* and *M. americanum* is attributed to a differential response between polarized solar irradiation and unpolarized light diffused through tent walls. [E.M.]

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HILLTOPPING IN AFRICA AND ALASKA
LIFE HISTORY OF *PAPILIO MULTICAUDATUS*
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NOMINATIONS FOR 1956 OFFICERS

(Complete contents on back cover)

22 December, 1955

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SOME OBSERVATIONS ON THE HABITS OF *STRYMON FALACER* (LYCÆNIDÆ)

by Harry K. Clench

During the summer of 1950 I observed *Strymon falacer* Godart in large numbers in the vicinity of my former home in the village of Willow Run, Michigan (2½ miles NE of Ypsilanti, Washtenaw Co.). This extreme abundance provided an unusual opportunity for the collection of data, not readily obtainable otherwise, concerning certain aspects of the habits of the species. A special (but unhappily not achieved) goal was information concerning possible differences in habits between *S. falacer* and its sibling species, *S. caryævorus* McDunnough. The latter was already known to occur in the same general area (Clench, *Lepid. News* 4: 14; 1950), but it was so very rare in 1950 (only three taken, to over 150 *S. falacer*) that no observations of moment were possible in that direction.

In the following year, 1951, *S. caryævorus* was about as rare as before but *S. falacer* was again very abundant, and further observations were possible, though other duties made them less extensive than in 1950.

THE AREA COVERED

Three fields, once apparently farmed but now largely fallow, served as the locus of the bulk of these observations.

The first field is a gently sloping, rectangular area of rather large size (roughly estimated at 200 by 400 feet), its short lower end delimited by a small, sluggish stream, the two long and the short upper sides all bordered by woodland (see below). The lower quarter of the field is entirely given over to small truck gardens rented to local residents; adjacent to this is a portion that perhaps two or three years previously had been plowed for similar gardens, but not used and left fallow and largely barren: these two portions making up about half the length of the field. The remaining, uppermost, half has been abandoned for about ten years, to judge by the few hawthorns, elms and other saplings that are sparsely scattered over it, and is covered with a dense mixture of grasses and herbaceous annuals: the usual plants of idle fields in the area. The more significant of these may be listed, roughly in order of their abundance:

(1) *Potentilla* sp. (*intermedia* L.?). A moderately tall (about two feet), erect, yellow-flowered cinquefoil, very abundant in abandoned fields, along

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roadsides and so on in the whole area. Here mostly restricted to the upper portion of the field where it was generally dispersed.

(2) *Melilotus officinalis* (L.) Lam. A rather tall (3-4 feet), bush-like legume with yellow flowers. Abundantly distributed over the upper portion of the field and along the periphery and traversing paths of the remaining portions.

(3) *Erigeron* sp. (*strigosus* Muhl.?) A rather tall (3-4 feet), white flowered, aster-like composite, strongly localized in rather large stands, chiefly in the upper portion of the field.

(4) *Achillea millefolium* L. A short (1 foot), erect plant with white flowers. General, but low and not at all conspicuous.

(5) *Trifolium* sp. A short (less than 1 foot), white-flowered clover, generally distributed over the upper portion of the field, especially along the edges.

(6) *Trifolium pratense* L. A semi-decumbent clover (less than 1 foot tall), with large reddish inflorescences. Found all over the upper portion of the field, but distinctly more abundant in one corner.

(7) *Daucus carota* L. A rather tall (about 3 feet), white-flowered species, the common Queen Anne's Lace; occurring in all parts of the field but tending to clump in certain areas.

(8) *Melilotus alba* Desr. A rather tall (3-4 feet), bush-like legume, almost identical in appearance to *M. officinalis* (see above), but with white flowers. Generally distributed, principally in the upper portion of the field.

(9) *Chrysanthemum leucanthemum* L. var. *pinnatifidum* Lecoq & Lamotte. A small (1-2 feet), erect, white-flowered plant, the common Ox-Eye Daisy. Rather local, confined to the upper portions of the field.

(10) *Apocynum cannabinum* L. A rather tall (about 3 feet) and bush-like plant, the well-known Dog-Bane or Indian Hemp, with loose inflorescences of white flowers. Strongly localized in two patches, one near the border and one about 80 feet from the woods, in the upper portion of the field.

(11) *Hypericum perforatum* L. Tall (3-4 feet), yellow-flowered. Very local in one or two clumps near the border of the field.

(12) *Cirsium* sp. (*arvense* [L.] Scop.?) A small (1-2 feet), slender, lavender-flowered thistle, scattered but sparse, and only in the middle portion of the plowed-but-fallow part of the field, mostly 60 or more feet from the woods.

(13) *Asclepias syriaca* L. A moderately tall (2-3 feet), lavender-flowered milkweed, localized in a few clumps in the plowed-but-fallow portion of the field.

The woodland bordering this field is an oak-hickory association with a strong admixture of *Acer* (maple) and *Ulmus* (elm), and probably is of about 40-50 years' standing. A prevalent shrub stratum often reaches 14-20 feet in height, though its extent has apparently been curtailed by former grazing. These woods are rather dry in summer, but in the spring have much standing water.

The second field is much smaller, roughly the shape of an elongate isosceles triangle, and flat. It is bordered along the short side by an embankment above which is a paved road, on one long side by a stream and on the remaining side by woodland similar to that just described. The field is apparently frequently cut over and in spring has considerable standing water. The significant plants here are: *Erigeron* sp. in a dense stand near the road; *Melilotus alba,* common and evenly distributed; *M. officinalis,* about equally common and evenly distributed; *D. carota,* rather common and evenly scattered though with a marked tendency to clump in places; *A. cannabinum,* in a small patch near the woods at the far apex of the field.

The third field is oval in outline, nearly touching the far apex of the second field (separated from it by perhaps 20 feet of woodland), bordered partly by the same stream which, however, is here hidden from view by a parapet of earth about 10 feet high, and limited elsewhere by woodland of the same sort as already described. The dominant plant by far in this field was *Melilotus officinalis* which grew in great profusion, relieved only by three or four scattered plants of *M. alba.*

The areas of the last two fields combined would not equal that of the upper portion of the first field.

METHODS

The general pattern of collection and observation was as follows: On each trip a route, more or less at random, was followed so as to sample all of the fields, and the major plants in them, as nearly as possible in proportion to their abundance. During the course of this route every possible specimen of *S. falacer* was taken, papered immediately after pinching, given an individual number (in a consecutive series started afresh each trip), and at once was marked on the paper the estimated distance of the capture from the woods, a notation indicating the rather precise location of capture, and what the specimen was on at time of capture—leaf or flower, and of what species. On return to the house the necessary general data were inscribed on each paper (place, date of capture, time and duration of trip, field catalogue number), and all the information on the specimens was copied into the field notebook, adding the sex of each, in the same order as captured originally. In addition to the above information, all notes made on behavior and so forth were entered into the field notes for that day.

Due to the time necessarily consumed by the marking of the information on the papers as the specimens were taken, the number captured in a trip was much below what could have been taken had no notes been made. In optimum conditions of *falacer* abundance, when a specimen could be netted almost as fast as desired, with little or no loss of time in searching, the number taken averaged about 1 specimen every two minutes.

In all, six trips were made in 1950 and eight in 1951. Data from six of these fourteen were not usable in much of the following account, due to the late hour, insufficient sampling, or other bias in collecting.

RESULTS

The following notes, though necessarily somewhat random, and in most places regrettably incomplete, do furnish a basis for further investigation and suggest some curious and interesting things.

1. *General frequency.* In the previous two years (1948, 1949) of my residence in Willow Run, I had always sought *S. falacer* in the above mentioned wooded areas, where it occurred uncommonly (six or eight in an afternoon being a good catch).

The fields here discussed were never visited prior to 1950, or at most only briefly and in unfavorable places. It is, thus, impossible adequately to compare the very high frequencies observed in 1950 and 1951 with those of previous years. The numbers observed in these last two years seemed very comparable one to the other; and on the few occasions that the old woodland haunts were revisited, *falacer* was found to be about as common there as it had been in 1948 and 1949. The only inference possible, though admittedly on very slender evidence, is that the frequencies of the last two years, though striking in comparison with previous experience, were not abnormal and were merely the result of collecting in a different and more favorable situation; and therefore that these numbers represent normal abundance there.

2. *Period of flight.* The earliest date of emergence is not well documented. In 1948 the first record was a perfect pair, male and female, captured on 30 June. In 1949 the first specimen, a perfect male, was taken on 25 June at another locality a few miles distant. In 1950 none was seen on 25 June during collecting in the area, and the next trip there, on 4 July, revealed them in large numbers. In 1951 a trip on the 16th of June showed none, whereas on 23 June they were abundant, though less so than two days later. The first appearance, then, apparently fluctuates from about 20 June to 1 July in the area.

Records of the last appearance are even poorer, but suggest that the normal flight period is roughly 5 weeks' duration, ending in the last few days of July when the flight period begins early, to the first week in August, when the flight period begins late.

3. *The over-all proportion of the sexes.* Combined figures for the two years (except a few biased trips) show 156 males and 55 females, or about 2.8 males per female. This is more conveniently expressed as the fraction of males in a given sample, in this case 0.74. As will be shown below, the sex ratio in the fields varies with the hour of the day, and most of the observations were made during, or very near, the critical time (between 6 and 7 PM), when the proportion of males increased markedly. Furthermore, without knowing more of the separate behavior of the sexes it is impossible to assert that a representative sample of them visit the flowers in the fields. In this connection, however, it may be noted that of the specimens taken in 1948 where sexes are given in my notes, and most of which represent woodland captures, 12 were males, against 4 females (proportion of males, 0.80). In 1950-1951, limited collecting in the woods yielded a total of 14 specimens (proportion of males, 0.56). On the whole, though observation is deplorably insufficient, males would

appear to outnumber the females, and possibly as much as three to one. This is in harmony with field and museum experience with many other *Strymon* and other Thecline genera.

4. *The daily change in field sex-ratio.* Most of the collecting and observation of *S. falacer* was done in the afternoon, often until failing light made collecting—or even seeing—difficult to impossible. As a result there was ample opportunity to observe the interesting changes in the proportion of the sexes which take place towards evening.

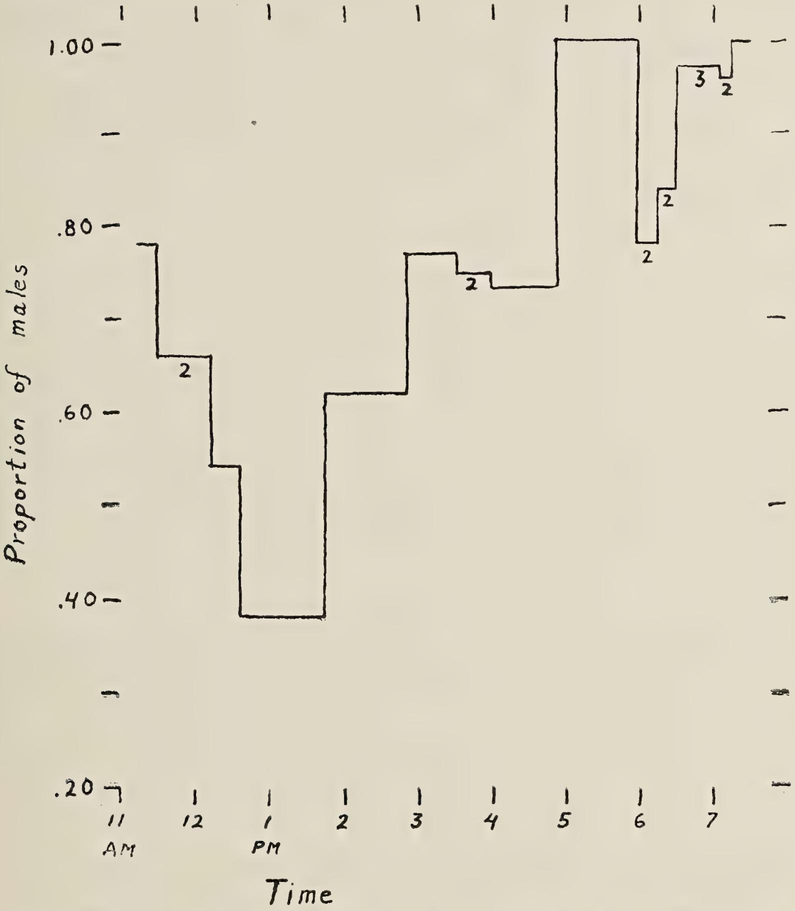

Fig. 1. Daily change in the proportion of the sexes of *S. falacer*. The small numbers under parts of the line indicate the number of observations on which average is based. In all other places only single observations provided the figures.

From noon until about 3 PM the proportion of males in the fields is apparently about 0.6 or so. At about the latter time the proportion begins to rise and by 4 PM it is more nearly 0.75. It remains there until 6:30 or so, when rather suddenly it rises to very nearly 1.0. Shortly after 7 PM the field was nearly dark and all *falacer* had departed.

This change in sex-ratio is apparently accomplished by the gradual withdrawal of females into the woods. It is most probable that actually both sexes begin to return to the woodland, females at first in the majority, then as their absolute number is reduced, males predominating until shortly after 7 PM when the fields are empty. The slim numerical data in support of these contentions are given in fig. 1. They are, however, buttressed by considerable observation in the field, not reducible to figures.

An interesting correlative to this was observed several times as dusk approached. Specimens were seen spontaneously to abandon flowers and fly, not overly rapidly but quite directly and purposefully, towards and into the nearest woods.

5. *General activity.* At all times during the daylight hours very little spontaneous flying in the fields was observed. Individuals remained at single inflorescences for long periods of time, and seldom flying far unless disturbed.

An activity that has been recorded for this and allied species is the so-called "battle." Two, or sometimes more, individuals (usually or always males?) fly in a circle about two feet in diameter, one chasing the other very rapidly the while slowly rising into the air to a height of twenty or so feet, where they "break" and the participants descend and go their separate ways. No such activity was ever noted in the fields, though on one occasion in a woods clearing two males (as proved by subsequent capture) were seen so engaged. Neither was there any courtship activity, nor any mated pairs. It is possible that *falacer* may mate late in its flight period, in the evening, and only near its foodplant (and hence in the woods); and possibly that mated pairs will be found partially concealed on leaves of low shrubs. This possibility is suggested by analogy with the habits of *S. acadica.*

TABLE I

Numbers of *S. falacer* captured at different distances from the woods edge

Distance (feet)	0-4	5	10	15	20	25	30	40	50	60	70	75	80	90	100
No. males	12	13	40	11	29	3	9	3	9	2	1	1	1	0	1
No. females	1	2	4	4	10	2	3	1	3	2	0	1	1	0	0

6. *The relation of* falacer *frequency to distance from woods.* It was soon apparent that *falacer* frequency was definitely correlated with distance from the woods. Before detailing this relationship, a brief description of the distribution of frequencies in the woodland itself would not be amiss.

Throughout the wooded lands adjacent to the fields the occurrence of *falacer* may be called minimal—rare, unpredictable, random incidences only. In scattered favorable situations—a generous play of sunlight shining through breaks in the upper leaf canopy onto the leaves of shrubs below—*falacer* will be met occasionally in slightly increased numbers, though still far from commonly. The most I have seen at one time under such circumstances is three or four.

Where these woodlands yield abruptly to the fields under discussion, however, the situation suddenly changes. At the woods edge itself *falacer* is more abundant than anywhere within the woods. As the edge is left (*i.e.*, towards the center of the field), the frequency rapidly rises to a peak about 15-20 feet out. Thereafter it almost as abruptly drops, the rapidity of the drop lessening markedly about 30 feet out. At roughly 40 feet the frequency is close to that at the woods edge; at 70-80 feet it is about that of favorable woodland glades; at 100 feet it approximates that of general woodland distribution. This frequency distribution is shown in graphic form in fig. 2a, based on part of the data in Table I. Here recorded captures of both sexes combined are spotted.

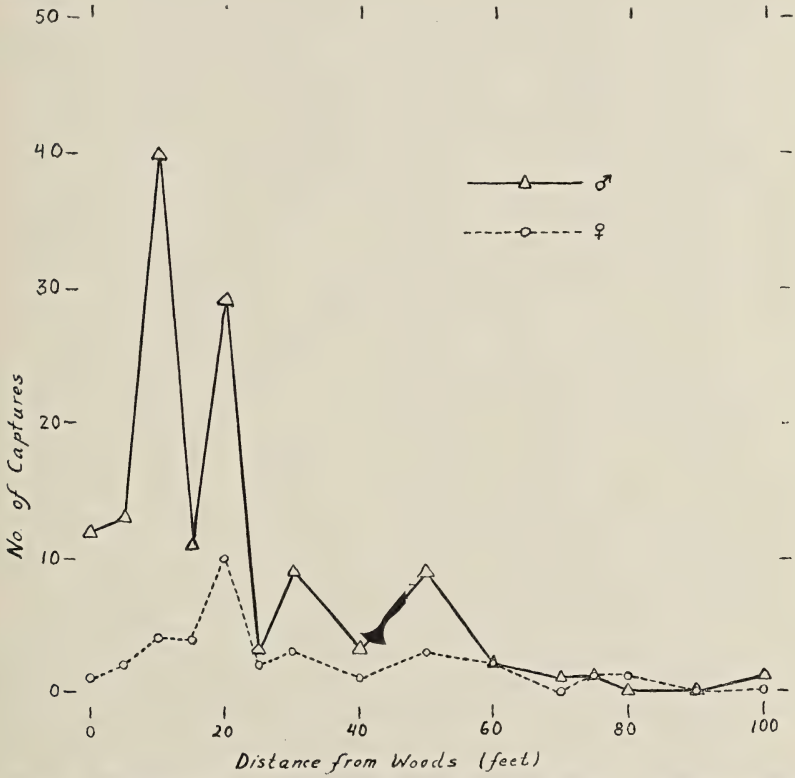

Fig. 2a. Combined male and female captures of *S. falacer* at different distances from the woods.

The above-described distribution of frequencies occurs in spite of uniform illumination by the sun of the whole field and even within the edge of the woods a certain distance. Shading of parts of the fields by the descent of the evening sun produced little or no noticeable effect, though as elsewhere observed there is at about this time a general exodus from the fields back to the woods. In short, distribution of field frequencies does not seem to be related to sunlight distribution, though the opposite is true within the woods, as already implied. In the woods, it might further be added, the individuals are not found on flowers, as in the fields, but rather on the upper surfaces of leaves.

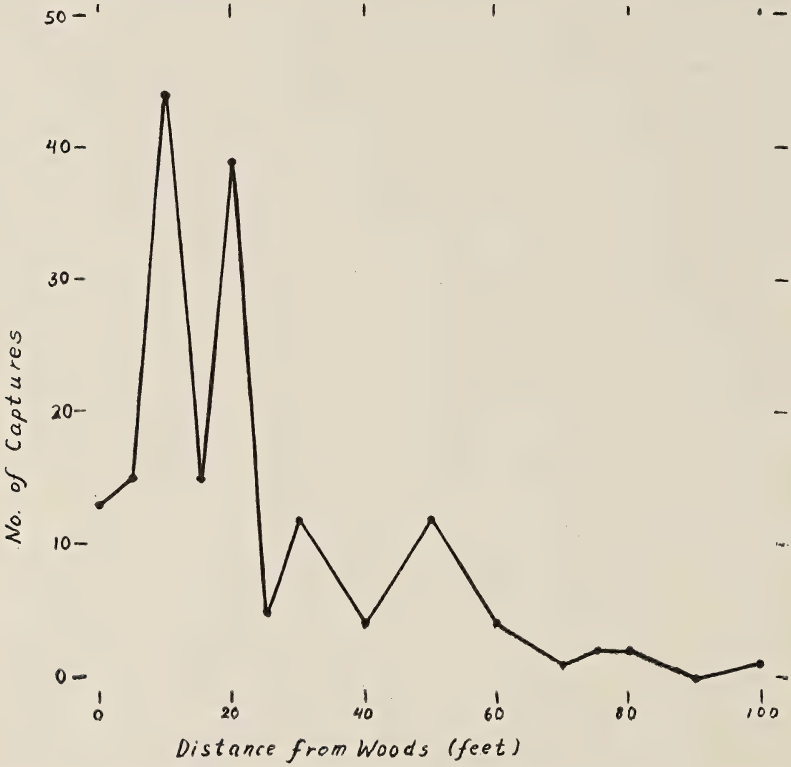

Fig. 2b. Captures of males and females of *S. falacer* at different distances from the woods.

A curious point in this distribution, not discerned in the impressions formed in the field, but showing up well in the tabulated and graphed data, is the somewhat different distribution of the two sexes. Since females presumably are more bound to woodlands, where their ovipositing activity must perforce occur (and since it has often been shown that when the habitats of the two sexes of a butterfly are different, that of the female is generally nearer the vicinity of the larval food), it is surprising to note that males seem to reach their peak closer to the woods than do females, and are more sharply restricted. Female frequency reaches a peak about 10 feet farther out, and they occur in greater relative abundance farther still than do males. The data for these generalizations are given in Table I, and are graphed in fig. 2b.

7. *Flower preferences.* It has already been implied that the dominant, if not exclusive, activity of the *S. falacer* seen in the fields was feeding at flowers.

In this activity some interesting preferences were noticed. Nearly all the specimens captured during the two seasons of study were taken on flowers in these fields, and for each was noted the species of flower on which it was taken. The combined results are given in Table III, which lists the plants involved roughly in order of their abundance, the principal flower color and height groups of each; and the total number, as well as the number of each sex, of *falacer* captured on each, and so on.

As can be seen from this table, the plants are divisible into three groups according to color (WHITE; VIOLET—including reddish to bluish; and YELLOW), and three groups according to size (SHORT—under one foot in height; MEDIUM—between one and two feet high; and TALL—exceeding two feet in height), making a total of nine combinations. The captures of *falacer* tabulated according to these combinations (Table II) show two very marked preferences: (a) for white flowers; and (b) for tall plants. The latter, in fact, accounts for over 90% of all captures on flowers. As would be expected, the combination of these two—tall, white-flowered plants—shows by far the largest figure of any of the nine combinations: over two-thirds of all flower captures.

TABLE II

Number of individuals, both male and female, of *S. falacer* taken on flowers of different colors and heights

Flower Color	Flower heights			
	Short (under 1 ft.)	Medium (1-2 feet)	Tall (over 2 ft.)	Totals
White	4	6	142	152
Violet	1	2	35	38
Yellow		0	21	21
Totals	5	8	198	211

The least popular classes of flowers appear to be the yellow-flowered plants, and the short ones. The particular combination of these two, however, was not specifically observed.

The preference for tall plants is quite in keeping with the observed woodland habits of the species, for there it was never seen perched on leaves lower than about two feet from the ground, and was most frequently seen between four and ten feet.

That these apparent trends are significant there seems little question. Specific preferences for certain flower species, however, also enter into the picture. Compare, for example, the captures on *Daucus carota* and *Melilotus alba,* two plants of about equal availability in point of numbers and situation, both with white flowers and of very comparable height. In spite of this, over 11 times as many *falacer* were taken from flowers of *M. alba* as from *D. carota.* Much more interesting, however, is the great difference between *M. alba* and

TABLE III

Flower preferences of *Strymon falacer.* See text for amplification.

	flower color	height class	*falacer* captures					chi square	P range	proportion of males	suggested favorization	class of flower preference
			actual			expected						
			total	males	females	males	females					
column no.	1	2	3	4	5	6	7	8	9	10	11	12
Potentilla (intermedia?)	Y	M	0	0	0	....	....	....	......	....		d
Melilotus officinalis	Y	T	21	12	9	15.6	5.4	3.23	.05 - .10	.57	F	b
Erigeron (strigosus?)	W	T	25	18	7	18.6	6.4	0.08	.70 - .80	.72		b
Achillea millefolium	W	S	4	2	2	3.0	1.0	1.33	.20 - .30	.50	F	c
Trifolium sp.	W	S	0	0	0	....	....	....	......	....		d
Trifolium pratense	V	S	1	1	0	0.7	0.3	0.43	.50 - .70	1.00		c
Daucus carota	W	T	8	3	5	5.9	2.1	1.42	.20 - .30	.38	F	b
Melilotus alba	W	T	90	74	16	66.9	23.1	2.94	.05 - .10	.82	M	a
Chrys. leucanthemum	W	M	6	6	0	4.5	1.5	2.00	.10 - .20	1.00	M	b
Apocynum cannabinum	W	T	19	10	9	14.1	4.9	4.62	.02 - .05	.53	F	a
Hypericum perforatum	Y	T	0	0	0	....	....	....	......	....		d
Cirsium (arvense?)	V	M	2	2	0	1.5	0.5	0.67	.30 - .50	1.00		b
Asclepias syriaca	V	T	35	28	7	26.0	9.0	0.60	.30 - .50	.80		a
Totals			211	156	55					.74		

Explanation of symbols.

Column 1. Y, yellow; W, white; V, reddish to bluish violet.

2. S, short (under 1 foot); M, medium (1-2 feet); T, tall (over 2 feet).

6 & 7. Expected numbers based on proportion of totals in columns 4, 5.

11. F, suggestive of being favored by females; M, by males.

12. a, preferred flower species; b, tolerated; c, casual; d, avoided.

its congener, *M. officinalis.* These two species are almost indistinguishable in growth form, size, leaf, floral structure, differing strikingly only in color. Furthermore, *M. officinalis* was the commoner of the two by several times. Yet over four times as many *falacer* were captured on flowers of *M. alba* as were taken on those of *M. officinalis.* The actual disparity in preference of *falacer* for these two is probably even greater than these figures would show. In the third field the dominant plant was *M. officinalis,* which virtually covered the restricted area of the field with a dense yellow tangle. Only a few scattered, isolated bushes of *M. alba* were present. Yet on each of the several visits to the field, anywhere from four to over a hundred (!) *S. falacer* were seen on *alba,* with only a very rare capture or glimpse of one on *M. officinalis.* Whether the deciding factor in the very obvious preference for *M. alba* over *M. officinalis* is the color difference, or some more subtle distinction such as nectar composition or quantity, cannot at this writing be stated. That it might, at least in part, be the latter is suggested by the interesting behavior of a female *S. falacer* observed on 8 July 1950. She was seen to alight, rather abruptly, on an inflorescence of *M. officinalis.* After several probes of the flowers with her proboscis, she withdrew and flew a few inches to a nearly juxtaposed inflorescence of *M. alba,* where she began feeding.

In the matter of specific preferences, a quantitative approach to the subject is exceedingly difficult owing to the manifest impracticability of providing the necessary accurate measures of flower abundance. Furthermore, since there is a variable preference for different distances from the woods, this, too, would have to enter into any such analysis. By default, then, a non-quantitative system was adopted of merely listing the flower species in estimated order of abundance.

Four classes of preference of *S. falacer* for the different flower species may be discerned, and appear to be fairly discrete: (a) preferred; (b) tolerated; (c) casual; (d) avoided.

In the first group, the "preferred," may be listed *Asclepias syriaca,* probably the most favored of all. Considering the uncommonness of this plant in the fields compared to the others, 35 captures on it is a large number. At every visit one could count on finding at least one, and usually more, on every plant within reasonable distance from the woods. Second in this group is undoubtedly the already discussed *Melilotus alba,* from which were taken almost as many specimens as were captured on all the others combined. The relatively great abundance of this plant, however, makes the figure not quite so significant as the smaller number on the far less frequent *A. syriaca.* Third, and last, in this group is *Apocynum cannabinum.* Again, the recorded number of captures (19) is less than for someof the species listed below, but this flower was very infrequent.

In the second group, the "tolerated," we find a number of species on which captures were too frequent for them to be only "casual," yet far below the frequency shown for those dubbed "preferred." First among these is *Erigeron* sp., with a number of captures sufficiently large that it possibly ranks close to the borderline between "tolerated" and "preferred." Second is *Daucus carota* with eight recorded captures. *Chrysanthemum leucanthemum* is close behind if at all, with six captures, correlated with a lesser frequency of the plant. *Melilotus officinalis* is probably next, and although it has many more captures (21), it was also one of the most abundant of all the plants in the fields. Very difficult to place in correct sequence is *Cirsium (arvennse?).* It was very infrequent, and furthermore was almost exclusively found at rather great distances (40 feet and more) from the woods, so the two captures thereon are difficult to interpret.

Only two species of plants make up the third group, the "casuals," *Achillea millefolium* and *Trifolium pratense.* Undoubtedly further collecting could increase the number of casual species slightly by adding one or more of the less abundant species of plants. It will be noted that both these species are in the "low" size group.

Of the fourth group, the "avoided," by far the most striking is the *Potentilla.* This exceedingly abundant plant was repeatedly surveyed for *falacer* without ever a specimen having been sighted on it. There seems little doubt that *falacer* actually does avoid this species. The same statement may be applied to the small *Trifolium* sp., though as I paid less attention to it in the field the assertion is open to more doubt. It possibly may be found to lie in the "casual" group. Though white-flowered, it is exceedingly low and possibly for this reason as much as for any other it is bypassed. *Hypericum perforatum,* though not very common, was tall and prominent and was repeatedly searched for *falacer.* As with the *Potentilla,* however, no trace was ever seen of the butterfly on it. It should be emphasized here that a complete census of the plants in flower in the fields during the flight period of *falacer* was not made. As a consequence there are undoubtedly a good many species that could have been added to the list, all of which, since no *falacer* was taken on any of them, would have been assigned here. These additional species for the most part would be small or very uncommon: definitely not part of the dominant field vegetation.

One of the more interesting aspects of *falacer* flower preference is the difference between the sexes in their preference for certain species. There is no indubitable instance of a plant species exclusively visited by either sex[1] but there are several indications of a stronger preference by one sex or the other for certain species.

Samples, unfortunately, are too small for the results to be statistically convincing, though they are suggestive. The essential data are given in Table III: flower species visited; total number of *falacer* on each; number of each sex on each; the expected numbers of each sex (based on the sex ratio of the totals for the whole table); the value of chi square for the comparison of actual and expected numbers of the sexes; the resulting probability ranges (*i.e.*, probability that a deviation as great or greater than that observed would be due to chance alone).

The customary fiducial limits for such probability values are usually $P = .05$ or less, or $P = .01$ or less; and as can readily be seen only one of the values in the table is less than .05. In interpreting the results, therefore, the following decisions are made with regard to the probabilities:

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[1] Three plant species have recorded for them only male captures: *Trifolium pratense, Chrysanthemum,* and *Cirsium.* The numbers taken on all of these, however, are so small that no certainty whatever may be attached to them as indicating exclusive male visitation.

over 0.30	not indicative of difference,
0.30-0.20	slightly suggestive of difference,
0.20-0.10	suggestive of difference,
0.10-0.05	strongly suggestive of difference,
less than 0.05	probably significant difference.

On this basis, then, six of the ten flower species on which *S. falacer* has been taken show some degree of suggestivity of selection by one or the other sex, and these may therefore be divided into two groups:

(a) Favored by males

Melilotus alba	strongly suggestive
Chrysanthemum leucanthemum	suggestive

(b) Favored by females

Apocynum cannabinum	probably significant
Melilotus officinalis	strongly suggestive
Achillea millefolium	slightly suggestive
Daucus carota	slightly suggestive

It is interesting to note that the two *Melilotus* species are contrasting.

APPENDIX

In 1953 I was able to collect *S. falacer* in Pennsylvania under very comparable circumstances to those in Michigan, described above: a mixed deciduous woodland, bordered by an old field, well provided with *Melilotus officinalis* and *alba, Asclepias syriaca,* and others of the same species seen in the Michigan fields. The locality was near Ohio Pyle, Fayette County. The only *S. falacer* seen were in the woods itself, in open glades and sunlit patches, on leaves from four to ten or so feet from the ground: very comparable in situation and frequency to the woodland occurrence in Michigan. Nowhere in the field, however, was a single *S. falacer* seen.

The question is entirely open; is the cause of the abundance of *S. falacer* in the Michigan fields: (a) a genetic peculiarity of the Michigan population; (b) a freak situation of the locality; (c) a non-localized phenomenon which may occur anywhere, depending only on a particular concurrence of several events; or (d) something else?

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RETRIEVING MARKED *ANTHOCARIS REAKIRTII*

by WILLIAM H. EVANS

At the suggestion of Dr. C. L. REMINGTON, I have been marking specimens of *Anthocaris reakirtii* Edw. with cellulose paint and releasing them in order to learn more about their flight habits. In my previous studies of unmarked specimens (*Lepid. News,* vol. 8: p. 10), it had been possible to keep track of all the males that made the short round trip to the head of the small canyon back of my house; however, there had been no way to determine if those which flew out of this side canyon into the main part of La Tuna Canyon ever returned to my yard.

By using a different color paint each day and by painting the small dot in a different position on the hind wing of each butterfly, it was possible to identify each individual. Immediately after netting each male when he flew at the dead decoy specimen on my net (*Lepid. News,* vol. 6: p. 100), I transferred him to a small transparent plastic box which I then covered with a cardboard box. While the butterfly settled down to rest in the darkened container, I wrote in my notebook the time of capture, number of the specimen, and the color and location of the spot to be painted on the underside of one hind wing. After two or three minutes in the dark, the sleeping butterfly could be held with a large pair of forceps while the dot of paint was applied with a straw. When released, most flew to a nearby bush to rest before flying away.

The frequency of return of marked *A. reakirtii* was surprising. Between February 7 and March 2, 1954, 33 of the 68 males marked were recaptured: 17 were recaptured once; 10, twice; 3, three times; and 3, four times. Sixteen were recaptured the first time on the same day they were marked; 8 were recaptured the first time on the day after being marked; 6 returned the first time on the second day; and 3 did not reappear until the third, fourth, and sixth day after being painted. No specimen was captured more than three times in one day. The 68 *A. reakirtii* were netted 126 times.

During 1955, my *A. reakirtii* marking was limited to a ten-day period in February. Of 17 males netted, only four were recaptured; however, this small percentage of recaptures can be explained by observing the effect of unfavorable weather on *Anthocaris* flight. Five released specimens failed to reappear after a two-day rain. The chances of recovering 5 other individuals, which I marked on a warm day, were greatly reduced when the next two days turned so chilly that hardly more than one hour each day was warm enough for butterflies to fly.

This method of releasing and recapturing *A. reakirtii* males in just one spot has proved that in wandering along the main canyon and up and down side canyons, about half of the males making a round-trip in a particular side canyon are likely to return at least once to that same canyon. The females almost never return to the same area. To determine how far males and females wander, it would be desirable to have several collectors searching for the marked butterflies in various branches of La Tuna Canyon.

8711 La Tuna Canyon, Sun Valley, Calif., U. S. A.

FOREWING LENGTH AND FLIGHT PERIOD OF *DANAUS PLEXIPPUS* IN THE GULF STATES

by Bryant Mather

In 1945 Beall and Williams presented a valuable and statistically well analyzed discussion of geographical variation of forewing length of *Danaus plexippus* Linnæus. Beall and Williams give measurements of 1553 specimens from North America; 19 of these came from Florida and 105 from Louisiana. The largest ♂ and ♀ were from Ontario, the smallest from California. The averages and ranges of forewing length reported were:

	North America		Florida		Louisiana	
	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀
Average	...	...	51.4	50.9	50.6	50.2
Maximum	59	57	54	55	56	53
Minimum	43	40	49	47	45	44
Number	848	705	11	8	71	34

The frequency data (Table 1) indicate that the most frequent forewing length was 52 mm in the entire sample of 1553 specimens, in the 848 ♂♂, in the 705 ♀♀, and in the 124 specimens from Florida and Louisiana. No specimens with forewing length less than 40 mm (44 mm in Florida and

TABLE 1. Frequency data [from Tables II and V of Beall & Williams (1945)].

FW length mm	*nigrippus* ♂♂	♀♀	Total	%	Louisiana ♂♂	♀♀	Total	%	North America ♂♂	♀♀	Total	%
34	1		1	0.46								
38	1	1	2	0.92								
39		2	2	0.92								
40	1	1	2	0.92						1	1	0.06
41	2		2	0.92								
42		3	3	1.38						1	1	0.07
43	4	2	6	2.75					2	1	3	0.19
44	10	7	17	7.80		1	1	0.95	5	5	10	0.64
45	7	14	21	9.63	4		4	3.81	13	5	18	1.16
46	20	18	38	17.43	3		3	2.86	16	11	27	1.74
47	22	13	35	16.05	2	1	3	2.86	20	10	30	1.93
48	23	13	36	16.51	2	3	5	4.76	30	39	69	4.44
49	14	10	24	11.01	3	4	7	6.67	57	50	107	6.89
50	19	2	21	9.63	13	8	21	20.00	98	84	182	11.72
51	4	1	5	2.29	19	9	27	25.71	128	115	243	15.65
52		2	2	0.92	13	7	20	19.05	160	142	302	19.45
53	1		1	0.46	9	1	10	9.52	150	121	271	17.45
54					3		3	2.86	92	72	164	10.56
55									51	36	87	5.60
56					1		1	0.95	21	10	31	2.00
57									3	2	5	0.32
58									1		1	0.07
59									1		1	0.06
Totals	129	89	218	100	71	34	105	100	848	705	1553	100

Louisiana) nor more than 59 mm (56 mm in Florida and Louisiana) are recorded. BEALL (1946) refers to 105 specimens from Louisiana as representing late fall material, he also refers to Louisiana specimens in a subsequent paper (Beall, 1948). It is presumed that these are the same specimens that are referred to above.

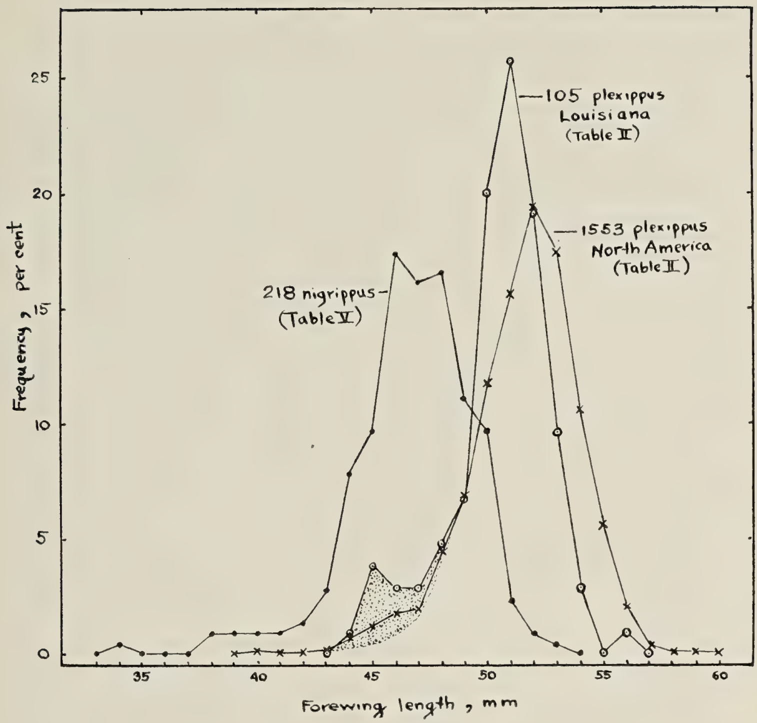
Data on 24 specimens collected by me are given in Table 2. For these 24 specimens as a group and for the 18 from Mississippi, the most frequent forewing length is also 52 mm. The Maryland female with a 38 mm forewing is 2 mm shorter than any among the 1553 examined by BEALL and WILLIAMS. The Mississippi female with a 41 mm forewing is 3 mm shorter than any of the 124 from Florida and Louisiana.

The frequency data in Table 1 are plotted in the figure. For each distribution the most frequent forewing length is nearer the maximum than it is to the minimum, perhaps reflecting the fact that there are more cases in which circumstances intervene to cause a butterfly to fail to reach its normal size than there are cases in which a butterfly is caused to become larger than normal.

TABLE 2. Data on 24 specimens

Forewing length mm	Number of occurrences	Sex	Locality	Date
38	1	♀	Towson, Baltimore Co., Md.	22 Jun 34
41	1	♀	Clinton, Hinds Co., Miss.	3 Jun 51
49	3	♂	Clinton, Hinds Co., Miss.	3 Oct 46
		♂	Clinton, Hinds Co., Miss.	10 Oct 54
		♂	Biloxi, Harrison Co., Miss.	23 Sep 51
50	1	♀	Tuckahoe, Westchester Co., N.Y.	6 Aug 44
51	5	♀	Clinton, Hinds Co., Miss.	13 Oct 51
		♀	Clinton, Hinds Co., Miss.	28 Sep 52
		♀	Clinton, Hinds Co., Miss.	1 Apr 53
		♀	Jackson, Hinds Co., Miss.	23 Oct 54
		♀	Memphis, Shelby Co., Tenn.	24 Oct 54
52	7	♂ ♂	Clinton, Hinds Co., Miss. (2)	29 Sep 51
		♂	Clinton, Hinds Co., Miss.	29 Mar 52
		♂	Clinton, Hinds Co., Miss.	7 Apr 52
		♂	Clinton, Hinds Co., Miss.	8 Jul 52
		♀	Jackson, Hinds Co., Miss.	23 Oct 54
		♀	Gulfport, Harrison Co., Miss.	20 Mar 54
53	2	♂	Clinton, Hinds Co., Miss.	29 Sep 51
		♀	Clinton, Hinds Co., Miss.	6 Oct 51
54	3	♂	Clinton, Hinds Co., Miss.	29 Sep 51
		♂	Hollofield, Baltimore Co., Md.	5 Aug 33
		♀	Coalburg, Kanawha Co., W.Va.	6 Sep 51
57	1	♂	Tuckahoe, Westchester Co., N.Y.	6 Aug 44

The Louisiana sample is taken from a smaller area, is more homogenous, and shows a greater central tendency than the other two. The Louisiana frequency polygon has a second minor peak at 45 mm forewing length, stippled on the figure. The most frequent length for *D. plexippus nigrippus* is 46 mm.



A. H. CLARK (1941), after examining many specimens including 70 from the vicinity of New Orleans, La., taken in Nov. 1937 by PERCY A. VIOSCA, the same collector who provided the specimens examined by BEALL & WILLIAMS, concluded that some of these were *D. plexippus megalippe* Hübner (= *nigrippus* Haensch). CLARK and CLARK (1938,1951) discussed the matter further; they recorded the occurrence of individuals regarded as *megalippe* from Virginia, West Virginia (15 June and 4 July '38), Florida (18 Dec. '36), North Carolina (4 July '38), New York, Illinois, and Cornwall (England), as well as Louisiana; and regard them as "casual visitors . . . brought to this country on . . . steamers . . ." WILLIAMS (1942) suggested the possibility that these might be classed as intermediates rather than true *nigrippus*, noting that such intermediates occur in the West Indies, Panama, and occasionally on the north coast of South America. LAMBREMONT (1954) listed *D. plexippus melanippe* (Hübner) based on CLARK'S work and on one additional specimen in the Tulane collection taken in New Orleans 8 Aug 25. KLOTS (1951) stated: "Our Monarch is *D. p. plexippus* Huebner. The subspecies of Central and northern South America is *D. p. melanippe* Huebner (*nigrippus* Haensch) with shorter (46 mm), broader forewing with white subapical spots. Specimens resembling this occur as far north as New Jersey. We are dealing with a cline, with an enormous blend zone between northern and southern forms. We should refer to all North American specimens as race *plexippus*, no matter what their appearance." FIELD (1950) referred to *megalippe* as "a subspecies that is not found in North America, except as a rare visitor . . . not known to have migratory habits."

If the individuals taken from time to time in North America that are superficially indistinguishable from the non-North American population, *D. p. melanippe,* are part of that population and have arrived in North America by boat, plane, hurricane, or the like, then they are properly so designated. If they should become established as a resident population and do not interbreed with indigenous *D. p. plexippus,* then *D. p. melanippe* and *D. p. plexippus* are different species. If they interbreed with the local population, it remains *D. p. plexippus.* If these *melanippe*-like individuals are merely variants occurring in the *D. p. plexippus* population that, for some reason, more often turn up in coastal than in inland areas, then all that we have is *D. p. plexippus.* The minor peak at 45 mm on the Louisiana frequency distribution, the 46 mm peak on the *melanippe* frequency, the reference to 46 mm by KLOTS as characteristic of *melanippe,* the 38 and 41 mm individuals from Maryland and Mississippi listed on Table 2, all suggest that in southern and eastern coastal North America something happens to *D. plexippus* that adds an apparently significant and discontinuous batch of typically small individuals to the population. It may be entirely fortuitous that the data of BEALL & WILLIAMS for Louisiana suggest that this batch has a most frequent forewing length within 1 mm of that of *melanippe;* on the other hand it may indicate a *melanippe* content in the local population as suggested by CLARK. Careful studies appear urgently needed to establish the relations of these smaller individuals to the rest of the population. WILLIAMS (1949) stated that all of the over 160 individuals of *D. plexippus* captured or seen in the British Isles in the past 80 years, that have been examined, have been of the North American race. The CLARKS (1951) stated that of 157 individuals seen in England, 62 were captured, and that E. B. FORD wrote that 22 of these have been determined as to subspecies, and that one, caught in Cornwall in 1885, is said to be of the Central American type. FORD (1945) figured a specimen that he took in Cornwall in 1941. The CLARKS (1951) stated that this figure appears to represent the Central American form.

LAMBREMONT (1954) reported that *D. plexippus* has a flight period in Louisiana from mid-March through mid-December with April, October, and November as months of greatest abundance. He reported large southward moving flights in November 1941 and October 1949. Earliest and latest dates are 18 March 1950 and 15 Dec. 1949. These records do not agree with the report by VIOSCA quoted by WILLIAMS (1942): "Although Monarchs are absent in the deep south during the summer months, they arrive along the Gulf coast in numbers during October and November . . . After this migration we do not see any more throughout the winter." WILLIAMS (1942) stated that there is definite evidence in Florida of a period of summer absence — the last butterflies appear to leave Florida in the spring when the mean temperature rises above 75°F., and they begin to return at about the same temperature level. He remarked that there is some evidence that the butterflies are absent from Louisiana both in summer and winter. He concluded: "The most important points now to be settled are to find how far north the zone of complete absence extends in the summer; how far north winter hibernation can occur; and hence what is the extent of the area (which seems to exist in Louisiana) in which the butterflies appear only in spring and autumn."

My observations in Mississippi since 1946 have indicated the earliest date of arrival: 8 March 1952, latest date seen: 25 Nov. 1953. The earliest date in the past eight years has not been later than 27 March. Adults have been seen in every five-day period from 5-10 March through 20-25 November except 20-25 June in one or more of the last eight years. Freshly emerged adults were noted on 3 June 1949 and 26 May 1951; larvæ were seen on 29 June 1947; a mating pair was seen on 2 April 1952. Large congregations were seen between 25 September and 6 October 1951 (mostly males) and between 1 and 7 October 1954 (moving south).

My observations and those of LAMBREMONT seem to indicate that the zone of summer absence does not include Louisiana and Mississippi, and that winter hibernation has not been recorded in those states. A mean temperature of about 75°F. or higher is likely to exist in Mississippi from May through September; *D. plexippus* is less frequent during those months than in April and October. The beginning and end of the annual flight in central Mississippi coincides closely with the average dates of the first and last killing frosts: 19 March and 8 November; the mean temperature in March is 55° to 60°F. and in November 50° to 55°F.

SUMMARY

Data on 18 specimens of *D. plexippus* from Mississppi indicate that the most frequent forewing length is 52 mm. One with a forewing length of 41 mm, smaller than previously reported from the South, and one from Maryland with a forewing length of 38 mm, smaller than previously reported from North America, are noted. Data from BEALL & WILLIAMS (1945) are reviewed, and their relation to the possible occurrence of *D. p. melanippe* in North America is discussed. The flight period of *D. plexippus* in Louisiana and Mississippi does not include an interval of complete absence in the summer. Winter absence in central Mississippi coincides with the period between the first and last killing frosts; there is summer reduction in abundance with average temperatures higher than 75°F.

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THE WHEELER EXPEDITIONS TO THE SOUTHWESTERN UNITED STATES, 1869 - 1876

by F. MARTIN BROWN

The various expeditions lead by Lieut. WILLIAM MONTAGUE WHEELER, Corps of Engineers, U. S. A., sent to explore and map the territory west of the 100th meridian were the source of much new material in all fields of natural history. They are of particular interest to students of butterflies since many specimens brought back were made the types of species described by WILLIAM H. EDWARDS. Detailed information about where these specimens were collected often is lacking in the original descriptions and on the types themselves. Thus it is important that the routes travelled and the time table of the travels be established with as great accuracy as possible for the use of specialists in need of this information. Off and on during the past twenty years I have spent many hours and days studying all aspects of the expeditions and following their routes through the west. Dr. CHARLES L. REMINGTON has asked me to prepare this information for publication and thus make it available to those who need it.

This is a short outline of the work done by the various field parties. Each of the parties for which I have been able to gather sufficient information will be treated in detail with the necessary maps to show the routes followed in succeeding papers.

SEASON OF 1869—There were no naturalists on the reconnaisance party that in 1869 made a rapid survey of southeastern Nevada and western Utah. The Utah section of the survey was inconsequential, less than 2% of the season's work, and it covered only 400 square miles. I know of no material collected during this trip. However there is an abundance of notes of ecological importance in the various reports that were derived from the trip.

SEASON OF 1870—There was no field work this year.

SEASON OF 1871—The staff of the expedition included three naturalists for the season of 1871. Acting Assistant Surgeon WALTER J. HOFFMAN, a doctor with geological interests, was designated naturalist for the Survey. He had as assistants Mr. FERDINAND BISCHOFF, officially a hospital orderly, and Mr. FRANCIS KLETT, officially an assistant topographer. Dr. HOFFMAN joined the party at Carlin, Nevada, and remained with it until it reached Tucson, Arizona. BISCHOFF and KLETT were with the party throughout the season. Almost all of the biological material was collected by BISCHOFF; KLETT contributed a few specimens. The geological material was collected by HOFFMAN. The various parties into which the Expedition's personnel was divided covered southwestern Nevada, southern Nevada, California adjacent to Death Valley—the valley of Owens River—, northwestern Arizona, and central Arizona. A small section of Utah was examined in the vicinity of St. George. The party was in the field from May 3rd to December 11th when it broke up at Fort Lowell (Tucson, Arizona). THEODORE L. MEAD was a quasi-member of the Expedition and collected butterflies in Colorado during this season.

SEASON OF 1872—The naturalist for this year was Acting Assistant Surgeon H. C. YARROW, a zoologist, and his assistant was Mr. H. W. HENSHAW. This year the Expedition concentrated its efforts in Utah. About 10% of the effort was devoted to Nevada and 20% to Arizona. Several accidents destroyed some of the material collected.

SEASON OF 1873—This year the naturalist was a botanist, Acting Assistant Surgeon J. T. ROTHROCK, and his assistant was H. W. HENSHAW. While the main party operated primarily in Arizona, areas in Colorado, New Mexico, and Utah were examined. No mishaps occurred, and a large quantity of material was brought east for study. This included 288 butterflies caught primarily by HENSHAW. His party left Fort Wingate, New Mexico, on July 12th and terminated at Fort Apache, Arizona, on August 30th.

SEASON OF 1874—It was in this year that the largest number of naturalists were assigned to the Expedition. There were three naturalists, all Acting Assistant Surgeons, H. C. YARROW, zoologist, J. T. ROTHROCK, botanist and C. G. NEWBERRY, zoologist. The three assistant naturalists were Dr. JOHN WOLF, botanist, H. W. HENSHAW, zoologist, and GEORGE M. KEASBY, paleontologist. ROTHROCK and WOLF operated together out of Denver with Lieut. MARSHALL'S party. YARROW, HENSHAW, and KEASBY were with the main party headed by WHEELER and based at Pueblo, Colorado. Lieut. HOXIE, whose party was based at Salt Lake City, Utah, did not have an official naturalist assigned to him according to the published records. I believe that NEWBERRY worked with this party. CHARLES E. AIKEN joined the Pueblo party as ornithological collector some time during the season. HENSHAW, at least, wandered as far as Fort Apache, Arizona, although assigned to the southern Colorado party. The records for this summer's collecttions are somewhat confused. As an example, the summary of results indicates that no butterflies were collected, but the body of the report notes three new species that resulted from examination of the material brought in.

SEASON OF 1875—The field of operation this year was divided into three geographic areas, Colorado, New Mexico, and southern California. There were eight field parties in Colorado operating under Lieut. MARSHALL. The New Mexico party was commanded by Lieut. WHEELER and the California party by Lieut. ERIC BERGLUND. The naturalists were Acting Assistant Surgeons ROTHROCK and YARROW. They were assisted by HENSHAW and SERENO WATSON, a botanist. The report on natural history for this season was prepared under the command of Lieut. W. L. CARPENTER. Although the season was reported as a banner year for butterflies, I have seen very little in print about what was taken. Nothing collected in this season is reported in the *Zoology* section of the Wheeler reports.

SEASON OF 1876—I have been able to find no information about the naturalists assigned to the expedition for this or the following years. All that this means is that I must dig deeper into the official Army records in Washington. The season's work centered around the California-Nevada border somewhat north of the region studied in 1871. A little work was done in New Mexico and Colorado.

SEASON OF 1877—The year's effort was scattered over the entire Great Basin and southern Rocky Mountain regions, tieing together loose ends.

SEASON OF 1878—Most of the explorations made during 1878 were in California, with one party working eastward from New Mexico into Texas.

SEASON OF 1879—Work stopped on the grand plan on June 30th because no funds had been appropriated for fiscal 1879-1880. From this time on, the work was transferred from the Corps of Engineers to various more specialized government agencies, notably the newly formed U. S. Geological Survey. As might be expected, the field work became more geological and economic, to the almost total exclusion of other fields of study.

The detailed accounts of the travels and collections made by the various field parties that will be published in future articles are based upon careful study of the data on specimens collected, reports of the Chief of the Corps of Engineers, the official reports of the Wheeler Survey, and a multitude of scientific papers published as a result of study of the material brought back by the Expedition. The most helpful of these will be cited with each particular field-party study. The maps that accompany these studies are based upon the 1:500,000 Aeronautical Charts. The routes themselves were plotted from the Wheeler Atlas, reports of parties, bits gleened here and there in the various volumes of the Wheeler Survey report, and from actual retracing of the routes taken.

The official tally of specimens of insects that were collected by the Expedition is not accurate, as I have just pointed out. However it may be worth presenting if for no other reason than to emphasize the caution that must be used with the published reports.

ORDER	FIELD YEAR					
	1871	1872	1873	1874	1875	1876
Coleoptera	1300	100	4500	4200	1200	2000
Orthoptera	135	5	240	211	18	34
Lepidoptera	....	....	288	....	483	....
Hemiptera	....	....	.	....	....	....
Diptera, Neuroptera	....	...	50	....	...	...
Hymenoptera	....	....	450	....	790	50

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BUTTERFLIES AND HILLTOPS IN EAST AFRICA

by V. G. L. van Someren

In *The Lepidopterists' News,* vol. 8, no. 5, 1954, are two contributions on the subject of "Butterflies on Hilltops". The first records observations on Kennesaw Mountain, Georgia, U. S. A., and the second, on Basses Pyrénées, France.

In the course of extensive butterfly collecting in Kenya and Uganda, over many years, particular attention has been paid to hill-top associations; in fact it has become almost a routine in all areas visited. It soon became evident that certain species, unobserved in the surrounding country, could be obtained here with comparative ease. In fact, there was a concentration of these specialties, together with numerous other species difficult to come by in the savannah.

The "hilltops" vary considerably, and I should like, first of all, to describe briefly some of the types. Type a) has relatively small rock outcrops consisting of huge boulders with a few large trees growing around the crown and rising abruptly to about 50-100 feet above the grass land or scrub and surmounted by a single huge flat-topped bare rock. Type b) is a larger edition of a), rising to 200-300 ft. with more sloping, boulder-strewn sides and with some stunted vegetation on top as well as larger trees; these rock outcrops, called *kopjies* in South Africa, induce a limited concentration of butterflies such as a few *Charaxes, Papilio,* and *Acræa.* Type c) is a solitary boulder-strewn hill with coarse grass and some bush on its slopes with short grass and taller trees on the crown. Type d) is a low rocky range with one or two high points, covered in bush and rank grass on its slopes but with large boulders and taller trees on the "points". Type e) may be one of several hills forming a range and rising to 1000 ft. or more with rank grass and scattered trees on its slopes but with an area of short grass on the crown, some large rock slabs and taller trees right on top. Another type f) may be an immense rock formation with vertical face rising several hundred feet on one side and steep slopes on the others, covered in rank grass and tangled scrub but having a few dwarfed trees and short grass on the crown. Type g) is not a "hilltop" in the strict sense but it has the same effect; in many parts of the Great Rift in Kenya, which was produced by tectonic action, there are scarps of varying height, sheer on one flank where subsidence has taken place, and gradually sloping ground on the other as though the land block had tilted; the edge of the scarp is rugged and broken, and many points stand out along the rocky edge and most of these are sparsely tree-clad and form "points of attraction" for many species of butterflies.

All these hilltops have one thing in common....height above the surrounding grassland, bush, or savannah, combined with a few bushes or trees on the crown, which make suitable sunning and flight perches.

We have found that the hill *par excellence* is one that stands alone or juts out as a spur from a low range of hills and rises to about 200 feet above the surrounding savannah. One flank will be rather precipitous, the others with an easier gradient, boulder-strewn and with rock outcrops, and covered in rank grass, scattered trees, and bush. The crown of the hill will be flattish and covered with sparse short grass between large rock slabs and boulders and here and there a few bushes and stunted trees, the whole crown not more than 80 × 100 feet. So much for the general topography; we may now consider items which contribute to the general environment. The crown of the hill by reason of its exposure will be bathed in sunshine throughout the day, and because of the rock formations, which become very hot, considerable heat will be given off by radiation producing a warm up-current. The temperature on the hill top will be greater than that of the surrounding country. On a cloudless day, the rock slabs and boulders become so hot that it is unpleasant to sit on them! Moreover, since the "butterfly season" coincides more or less with the onset of rains, a great deal of moisture is retained between the surface soil and the rock formation below, and the atmosphere is steamy.

The butterfly population varies with the type of country and the district, but on most hilltops there is definite association or combination of species to be seen: a few papilios, a few acræines, nymphalines, and the odd lycænid and hesperid. The population is not static. Individuals of certain species may remain on a hilltop for days on end, appearing when the sun is shining and retiring to the shelter of trees when dull or at night, but the majority appear on the hilltop during the course of the day, but only if the sun is bright. A dull day produces no movement, and even when the sun is temporarily "blacked out" by a heavy cloud the insects previously on the move just disappear. They sit tight on tree, shrub, or long grass until the sun appears again. When the buterflies are on the wing they spend most of the time chasing each other and sunning themselves on vantage points of leaf or twig awaiting the opportunity to drive off all and sundry who may come too near their particular "perch". The majority of all the species are males, and if a female happens along she is at once chased and if pairing takes place the couple fly down the hillside out of sight. On many occasions we have visited hilltops early in the morning before the sun is hot. A few of the "residents" would be noted perched or flying sluggishly, but as the sun became hotter an influx of visitors would become apparent and the "flight play" commenced. No particular "point of entry" was ever noted which could be co-ordinated with prevailing breeze, inclination of hillside, or vegetation.

We have observed a definite periodicity for some species, and though the morning may have been bright and sunny from dawn onwards they would not appear until 10 a.m., when the rocks were already hot and radiated heat which could be felt. The majority of these species belong to various genera of Lycænidæ such as *Aphnæus, Spindasis, Argiolaus, Epamera, Myrina, Virachola,* and *Egumbia,* the great majority being males. As they arrived they would take up positions on certain favoured trees or bushes, giving chase to any which attempted to oust them from a favoured stance. The flight of *Egumbia* was always short, perhaps a couple of hours, and they would disappear down to the plains. *Aphnæus* remained until noon. *Agriolaus* and

Epamera had a main flight in the morning from about 10 to noon and then again between 3 p.m. and 5, but one species of the latter appeared only in the afternoon. There are other lycænids of the genus *Lepidochrysops* which keep to the ground and short grass, and though some of these seemed to remain on the hilltop as "residents" their numbers were augmented by flights mostly during the morning. Most hilltops have their quota of Acræas, distasteful insects which sail slowly around flaunting their conspicuous colours or perhaps sit on some exposed twig with wings expanded.

The *Papilio* population is not numerous; the ubiquitous *P. demodocus* Esper is usually present but it does not appear in flights, in fact most can be called resident. *P. leonidas* F. and *P. angolanus* Goez. contribute to the concentration, and the former by its leisurely flight is conspicuous. On some hills, *P. rex* is present.

Nymphalines are numerically strong, and some of these by reason of their size, conspicuous colours, and strong flight attract attention. Such are *Charaxes epijasius* Reiche, *Ch. castor* Cr., *Ch. achæmenes* Fld., and *Ch. viola* B. They have a strong, swift flight and are pugnacious; they chase each other hither and thither and often fight over a favoured exposed twig on which to sun themselves. When they fight over such a perch they beat each other with clips of the fore wing, and the noise is audible at quite a distance. The population is 100% male. There are usually two or three species of *Precis,* together with the ubiquitous *Hamanumida dædulus* F., and these content themselves with chasing each other around the rocks and bushes.

Amongst the smaller, but never-the less typical, hilltop visitors of interest are two species of Skippers of the genus *Abantis, A. paradisea* B. and *A. tettensis* Hopp. They too are very aggresive and jealously keep guard of a favourite stance, usually a bare twig. Their flight is extremely rapid and strong, and as they dart about it is almost impossible to follow them. Another Skipper usually plentiful along the edge of the crown of the hill is the common *Cœliades forestans* Cram., which may be seen basking in the sun or chasing any intruder out of its particular territory. One or two species of Satyrines are usually present; most are "residents", but still, they too go toward the general make-up of the hilltop fauna. Many day-long visits to hilltops has shown that even on a continuously sunny day there is a lull in activity toward noon till about 3 p.m. when "flight play" is again indulged in up to about 5 p.m., when the majority of insects disappear. I have occasionally stayed on a hilltop until almost sunset and then gone the round of the hilltop beating bushes and shaking trees to ascertain if any of the company were sheltering for the night, but seldom with result; the insects seem to descend to the surrounding country. Very few Pierines are seen on the hilltops, and those that do appear pass on after a very brief stay.

Although the hilltop population is a shifting one there is evidence that individuals of a species will visit a hilltop day after day for no other apparent purpose than to play around. The same individual will sit on a twig he occupied day after day; another caught up will be recognised by a break as one taken on two previous days and released, and so on.

Having observed this definite concentration of species on hilltops, one naturally seeks for some possible explanation. The insects don't come up the hill to feed, for there is no evidence of this; they don't choose this spot as a mating ground, for females seldom appear; they don't come up because the larval food plant is around, and there is a chance that a female may emerge; they just seem to delight in the freedom of uninterrupted sunlight and in flight play. Knudsen (1954) suggests that the insects are involuntarily carried up the hill by a warm up-current and that they are carried down by a cooling current; thus the population is ever changing. This suggestion, in my view, is highly unsatisfactory. I am inclined to the belief that the phenomenon is due to phototropic urge; the insects are attracted to a point of uninterrupted sunlight. Combined with this there would be, by reason of mass rock formation, a concentrated area of heat by radiation once the sun had raised the rock temperature beyond that of the surrounding country. There is no doubt that butterflies are strongly attracted to light and warmth. This can be seen frequently in the forest. Many species, and especially the male sex, will congregate in sunlit clearings of quite small size such as where a giant forest tree has fallen and cleared a passage in the dense growth; there will be a similar concentration in artificial clearings and along forest paths and roadways; the majority of insects are there to bask in the sun and display. This is surely a case of phototropism!

During a recent visit to the Teita Hills I visited a small stand of Eucalyptus trees which I knew to be heavily infected with borers. Wherever the workings were fresh a gentle ooze of fermenting exudate resulted, and this liquid proved most attractive to many insects including several Nymphalines, especially *Charaxes.* Most of the exuding wounds were 40-50 feet up the trunks, and both male and female *Charaxes* came to feed in considerable numbers. When the females were satisfied, they flew along the forest edge to rest or find their food plants on which to lay eggs. The males on the other hand, when full fed, congregated on the tops of two of the tallest trees at the edge of the forest and here they sunned themselves or chased each other round and round the tree tops. Returning to feed after a while, they would again resort to these same two tall trees as their chosen "playground". Why did they choose these two tallest flat-topped trees standing well above other sunlit trees? I suggest the same phototropic influence was exhibited here as in the case of hilltops: a high uninterrupted brightly lit area with plenty of flight room around it.

In the spring of 1954 we visited the West Nile district of Uganda, and in the Metu area had experience of hilltops of quite a different character to any previously described. About two miles from the camp there was a low chain of very rocky hills with considerable tree growth. With binoculars we could see that the entire range was made up of huge boulders, many as big as a fair-sized house, piled up one on top of the other, with lesser boulders supporting. There were several spurs or promontories along the range which looked promising. By the aid of the binoculars we noted that the entire chain was thickly covered by quite a heavy forest of a curious mixed type. Many of the trees were species associated with savannah, but here they grew to a large size and we noted considerable stands of Bamboo. From top to base, huge boulders showed up between the trees. It seemed obvious that the soil in crevices and pans amongst the boulders was very rich and that a quantity of water was held up amongst the rocks. We knew that the rainfall in the area was fairly considerable too. We eventually found that many species of butterflies associated with heavy forest were here in considerable numbers, but their presence was only made known when we investigated the peaks and "hilltops".

On our investigation of the range we examined the layout from about a mile distant and selected a couple of spurs, one for my friend and one for myself, about half a mile apart. Having walked to the base of the hills we were met by an almost inpenetrable barrier of thorny bush and creepers and large boulders along the fringe of the forest. We walked up and down looking for a reasonable point of entry but found none. We then decided to force a way by hacking through the tangle and making our way up to the peaks as best we could. First of all we took a bearing between sun and the position of the spurs, and each went his way.

There was no easy gradient up to the peaks, for after we got through the fringing barrier, it was a case of scrambling between huge boulders, making use of roots and saplings in rock crevices for hand and foot hold, often jumping from rock to rock or having to make detours around unclimbable boulders, then scrambling up almost vertical rock faces. After almost two hours of really hard going one eventually came toward the top of the spur to find that one had the choice of two likely "hilltops", one a huge domed rock 20-40 feet across, or three huge boulders with flattish tops, but with deep open crevices in between and about a yard across. The surrounding forest trees reached to 6-20 feet above the crown of the rocks, and from crevices in the rocks a few bushes and creepers grew in the debris; otherwise the rock top was open to the sky. The only way to get on top of the boulders was to climb an adjacent tree trunk, get into its branches, and jump. On the next visit to my rocks I took a local native who showed me a wellworn track up the hill; the gradient was not any less difficult than the path I had forced, and it was a bit longer, but one didn't get caught up in thorny creepers nor reach a blank wall of rock necessitating a withdrawal to seek a new path. There was one compensating factor in the rock climb, and that was the shade of the forest canopy.

Once on top, it was interesting to note that these great rock-tops, open to the sky, acted in just the same way as a hilltop. There was a concentration of butterflies consisting of *Charaxes* of half a dozen species, a few *Precis,* a species of *Euxanthe* and other nymphalids, two or three species of Hesperids, four species of *Acræa,* and several genera of Lycænids but predominantly *Argiolaus* and *Epamera.* All these behaved just as they would on a hilltop; they sat and sunned themselves on leaves and twigs or dashed after each other in the sunlight. Some of them consistently perched high, and one had to use a twenty foot pole to reach them. But there was an added interest to these rock-tops surrounded by heavy tree growth at their very edge, in that females of practically all the species encountered were present at some time or other. This was due to the fact that in many instances the surrounding trees, or parasitic *Loranthus* on them, were the foodplants of the species concerned. As in the case of hilltops here too we noted that the first flush of insects was about 10 a.m. when the top of the rock was in full sunlight and beginning to warm up. There was also the noon lull followed by a very distinct afternoon session, particularly of *Argiolaus* and *Epamera* which came in between 4 and 5 p.m. We were able to induce an even greater number of female visitors by means of using baited traps for *Charaxes* and by judicious "planting" of bunches of *Loranthus,* for *Epamera* and *Agriolaus,* on convenient trees. The sprays of flowering *Loranthus* had to be renewed daily as they withered in a few hours. The female lycænids visited the *Loranthus* to lay eggs. In this way we were able to capture many females which would not have been obtained otherwise.

On return to camp each evening, my friend and I compared notes and experiences. It was interesting to find that our respective hills had produced the same combination of species with one or two notable exceptions. His rock-top had a species of *Virachola* (Lycænidæ), which I never encountered on mine and he took them in some numbers and all were males. The larvæ of most members of this genus feed inside fruit, large berries, and seed-pods, and there was no doubt that somewhere in the vicinity of his rock the foodplant existed. My specialty was a species of *Charaxes,* first recorded from S. Abyssinia, then in Sudan, but still very rare and only once taken in N.E. Uganda. The larvæ feed on Bamboo and I had a stand of this at one end of my second rock, so I took a nice series of males and females.

It was not all sunshine on the rock peaks; nearly every day a rain-storm swept over. We kept an eye on the rain clouds as they moved over one hill after another, but we had a warning of their near approach, for every butterfly previously circling around disappeared. As the rain fell we scrambled down our rocks and took shelter under cover of overhanging rocks, sharing the protection with bats and Rock Hyrax.

The Sanctuary, Ngong, KENYA COLONY

THE NEW NOMENCLATURE RULES

A temporarily valuable pamphlet, "An unofficial interpretation of the International Rules of Zoological Nomenclature as amended by the XIII International Congress of Zoology, Paris, 1948, and by the XIV International Congress of Zoology, Copenhagen, 1953", has been issued by W. I. Follett, of the California Academy of Sciences, San Francisco, Calif., U.S.A. Any lepidopterist concerned with the technical aspects of nomenclature who has not already received this pamphlet will perhaps be able to obtain a copy by writing the author. It is a synthesis of the 1948 and 1953 amendments to the International Rules and will of course be replaced by the publication of the official revision of the Rules now in preparation. The 1948 and 1953 actions have been officially reported in painstaking detail by the Secretary of the International Commission, but these are not in a form one can easily use for rapid consultation.

C. L. Remington

MORE ON BUTTERFLIES ON HILLTOPS

by GEORGE W. RAWSON

The article about *Anthocaris genutia* congregating on hilltops published four years ago in *The Lepidopterists' News* appears to have created considerable interest judging by the appearance of six subsequent articles in which the authors relate their experience or observations covering the concentration of various species of butterflies on high ground or hilltops.

While the cause of this somewhat peculiar behavior appears to require more intensive and careful study, a possible explanation suggested by Mr. KNUDSEN (vol. 9: 141-142; 1954) coincides with my own ideas, namely that the cooler air in valleys or low places in proximity to mountain ranges ascends up the slopes after having been heated by the rays of the sun. This movement of air is thought to gain sufficient velocity to carry butterflies (principally if not exclusively males?) upward until the tops or summits of the mountains are reached, after which they are known to accumulate, sometimes in fair numbers. While this theory seems quiet plausible, more intensive as well as extensive study is needed to prove it. It is therefore hoped that sufficient interest has been created to cause lepidopterists to investigate this phenomenon whenever suitable opportunities occur during the coming collecting season. Why not jot down your resolution on your calendar pad so you will not overlook or forget such an interesting project when the time for action arrives?

In the hope that the following does not offend any sensitive reader, it might be advisable to remark that "casual" notes or observations are not sufficient. The object should be to accumulate as much data as conditions permit, such as the topography, altitude, vegetation, time of day, temperature, direction and character of flight, wind velocity and direction, normal or principal (local) habitat, range, feeding or other habits of both sexes, the species observed and their abundance, etc.

Further evidence of butterflies "fraternizing" on hilltops comes from an earlier observation of mine. This time the scene shifts to Alaska and the subject to that relatively rare form, *Papilio machaon aliaska* Scudder. While stationed for Yale University at the Naval Arctic Research Laboratory at Umiat situated on the Colville River about two hundred miles or so north of the Arctic Circle, my field companion, Dr. P. F. BELLINGER, and I were eager to take a series of this species. As luck would have it, we were not more than a few days at Umiat before both of us were so fortunate as to capture two male specimens in excellent condition on the tundra within a few hundred yards of the laboratory, thus establishing that we were in the right locality and present at the right time. However, as we succeeded in taking only a few males after several days' collecting, we decided to widen our field of search to higher ground. The next day was 10 July 1952, and we decided to try a small mountain of about 770 feet altitude which was situated a mile or so southwest of the camp.

This small mountain had an incline of approximately 40° and was fairly well covered by the prevailing type of "barren ground" vegetation such as dwarf birches and willows in wet or moist areas and ericaceous herbs, sedges, mosses and lichens on the drying ground. The temperature was around 75-80° F. and the wind velocity somewhere in the neighborhood of 10-15 m. p. h. The reader will probably recognise an inconsistency here. After suggesting that much attention should be given to the collection of details surrounding the congregation of Lepidoptera on hilltops, the writer failed to carry out these suggestions on this particular occasion. However, when we reached the summit we found, to our great delight, that *P. machaon* was present in sufficient numbers so that we were able to take a fine series of males in excellent condition in about one hour's frenzied collecting. Very few Swallow-tails were caught on the wing. With few exceptions, they were taken while feeding on a species of dwarf Pink and other species of Arctic or alpine flowers and in several instances on the bare ground. No females were seen or taken on this mountain, a few were taken on the tundra in the Colville Valley, also on the same type of habitat (namely low ground) at Chandler Lake on the northern slope of the Brooks Range of mountains.

Judging by my limited experience and as a result of the observations and reports of western collectors, a number of species of *Papilio* are known to ascend the slopes of hills and mountains and to congregate on their summit. *P. machaon aliaska* is no exception to this rule, if rule it is.

No. 1, Nassau Lane, Silver Springs, Md., U.S.A.

The TENTH INTERNATIONAL CONGRESS OF ENTOMOLOGY will be held at Montreal, Canada, from 17 to 25 August 1956. This will be the first Congress of Entomology to be held in North America in many years. Sections of the Congress likely to be of greatest interest to lepidopterists are the following: 1) Systematics; 2) Morphology and Anatomy; 3) Physiology; 4) Behavior; 5) Ecology; 6) Geographical Distribution; 7) Genetics and Biometrics. Individuals interested in attending the Congress should notify the Secretary as soon as possible, so that application forms and detailed information may be sent. His address: Mr. J. A. Downes, Division of Entomology, Science Service Bldg., Ottawa, Ont., Canada. **THE LEPIDOPTERISTS' SOCIETY WILL HOLD A SPECIAL MEETING AT THE TIME OF THE CONGRESS.**

NAME CHANGES FOR THREE SPHINGIDÆ OF JAMAICA

by MARGARET M. CARY

In the preparation of the pamphlet to be published by the Institute of Jamaica in the near future, called "Hawkmoths of Jamaica and related Species and Subspecies of the Antilles", C. BERNARD LEWIS, Director of the Institute, and I have, after long study of much field material and comparison of long series both in my personal collection and in the collection at the Institute, made the following name changes.

We believe, and are upheld in this belief by Dr. KARL JORDAN of Tring, England, that the name *Cocytius vitrinus musgravi* Clark must be sunk. There is no such insect. The one formerly so named has been proven to be as Dr. JORDAN believed from the first (see his letter in collection at Carnegie Collection, Pittsburgh, beside the so-called *Cocytius vitrinus musgravi* Clark) the female of the Jamaican *Cocytius duponchel* Poey. I say Jamaican *Cocytius duponchel,* because long series of Cuban and Haitian *C. duponchel* show green females like the green males of all *C. duponchel.* The gray female of *duponchel* is very common in Jamaica, and there are a few green females caught there, in a very long series. This female is gray with much white on its wings, and the spots on its abdomen are paler yellow than the orange spots of *duponchel,* and this gave the impression of *Cocytius vitrinus* R. & J., found only in Cuba. However the true *C. vitrinus* is smaller, has more pointed and narrower wings, and the hyaline section of the hind wing is much more extensive than that of the so-called *Cocytius vitrinus musgravei* Clark. This hyaline section in true *vitrinus* extends almost to the inner margin of the hind wing. PRESTON CLARK'S observations were based on very few specimens, whereas we base ours on very long series, every green *C. duponchel,* except two, in the Institute collection being a male and every gray moth being a female. This is true also in my collection.

Erinnyis obscura jamaicensis Clark we feel should be called *Erinnyis obscura* form "jamaicensis". In a series of over one hundred in the collection at the Institute and in almost that number in my own, there are many *E. obscura* which are about as large as *obscura* from Florida, Haiti, and Venezuela. These large ones are also as definitely marked as normal *obscura.* There are also a good number of *obscura* in the Institute collection and in mine that are smaller and somewhat paler in color and less strikingly marked. The small and the larger *obscura* of Jamaica have been caught on the same nights at the same locality in many cases. We believe the smaller *obscura* owe their size and general paleness to either foodplant or aridity. In any case we feel that this is a form rather than a subspecies and have so named it.

Erinnyis domingonis pallescens Clark we have also renamed *Erinnyis domingonis* form "pallescens". CLARK based his description of this subspecies on a few specimens sent him by a collector from one locality in Jamaica. He felt that these specimens were both smaller and paler than *Erinnyis domingonis* Butler of Florida or Mexico, or South America. In the series of *E. domingonis* from Jamaica in the collection at the Institute and in my own collection we find the size of Jamaican insects as large as those I have collected in Haiti, Cuba, and Venezuela, and it is only in absolutely fresh specimens from Venezuela and Haiti that the heavier black shading is noticeable. These heavy black scales rub off at once except under expert handling, and we therefore believe that these somewhat paler specimens from Jamaica are best considered a form rather than a subspecies.

Ellet Lane & Wissahickon Ave., Philadelphia 19, Pa., U. S. A.

SPHINGIDÆ COLLECTING IN JAMAICA AND HAITI, JUNE 1955

JOHN W. CADBURY III and I spent from the 8th of June until the end of June collecting Sphingidæ in Jamaica and Haiti. This period was chosen for the dark of the moon to a great extent and was also after heavy early June rains. We used a 200 watt clear light bulb, hanging it in all cases about thirty feet above ground on balconies that looked out over dark, wooded country, in which grew the food plants of the scarce moths we were looking for.

At Christiana, Jamaica, 3,000 feet elevation, we were seeking *Xylophanes jamaicensis* Clark, named from two specimens, one at Carnegie Museum in the Clark, Holland, Oberthür collection and one at the Institute of Jamaica. Both had been captured near Christiana, and the foodplant, a species of *Hamelia,* grew in the wooded hills of this region. We spent three nights here without getting this moth, perhaps due to the fact that these nights were very cold and clear, but we were fortunate in finding a young scientist who lives there and who had seen the moth in the Institute collection. He has promised to try to get it for us.

However, on our next trip in Jamaica to a place called Bonnie View, 600 feet above Port Antonio in a very tropical and well forested region looking towards both Blue and the wild John Crow mountains, we had great success, securing as far as is known the only male specimen of *Isognathus rimosa jamaicensis* R. & J. in any collection. Three females have been caught, one now in the Carnegie and two in the Institute collection. This was a freshly emerged and clearly marked specimen, whose photograph we will publish soon. We secured a fresh and clearly marked specimen of *Nannoparce poeyi* Grote, which we have also photographed since its freshness showed markings not clearly evident before. We caught a good many other nice Jamaican Sphinx moths such as *Erinnyis lassauxi omphaleæ* Boisduval, *Erinnyis domingonis* Butler, *Xylophanes chiron* Drury, etc., etc.

In Haiti where we had only three nights, we secured *Erinnyis lassauxi merianæ* Grote, which I had never before taken, beautiful freshly emerged male and female specimens of *Isognathus rimosa molitor* R. & J., *Erinnyis domingonis* Butler, and many others. I have since received from Petit Goave, Haiti, a beautiful specimen of *Perigonia manni* Clark; It has taken eight trips to Jamaica and four to Haiti to secure some of these.

MARGARET M. CARY, Ellet Lane & Wissahickon, Philadelphia 19, Pa., U. S. A.

NOTES ON THE LIFE-HISTORY AND METHODS OF REARING THE GIANT TIGER SWALLOWTAIL, *PAPILIO MULTICAUDATUS*

by George F. Pronin

Among our butterflies, one of the finest species is without doubt the beautiful Swallowtail, *Papilio multicaudatus* Kirby. In California it flies in the Sierra as well as in the valleys; its large and powerful wings enable it to reach and go over the high mountain passes.

It is in the canyons which are filled with sunshine, with a very hot soil of volcanic tuffs broken down by erosion, that these butterflies love to fly. There, direct from the riven stones arise the majestic Incense Cedar (*Libocedrus decurrens* Torr.), Yellow Pine (*Pinus ponderosa* Dougl.), and robust California Black Oak, (*Quercus kelloggii* Newb.). In the open spots in direct sunshine grow bushes of Choke-cherry (*Prunus demissa* Nutt.), the best host plant for the caterpillars of the Swallowtail.

At times the butterflies use their large wings like sails, rising in the breeze or on the waves of warm air which rise from the sides of the canyons. After midday the males fly along the canyon sides, looking very attentively for young females just hatching from their chrysalids or pupae. Any yellow thing attracts the males; one was even seen to fly round and round an empty corned beef tin which had a flamboyant yellow label!

Mating begins after midday and continues for about an hour and a half. On June 19, 1951, a pair was observed in a special butterfly cage at the Hat Creek Entomological Station in Shasta County, California; the male died one hour after copulation.

Egg laying cannot begin at once after breeding, except in the case of very old females which have in their bodies overmature eggs. Females of the Giant Swallowtail usually produce about 55 eggs, but do not start to lay for two or three days after fertilization.

After mating the female visits many different kinds of flowers to obtain nectar. The favorite in the Hat Creek area is the Tiger Lily (*Lilium pardalinum* Kell.), which grows along the irrigation ditches. When ready to lay her eggs, however, she leaves the flowers and searches for open spots where young Choke-cherries grow. The female produces about 6 or 7 eggs during one day, and the egg laying period extends over some ten days. The eggs are always put on the upper side of leaves, and after laying on one tree she flies off for a considerable distance.

The females of the giant Swallowtail like very much to lay their eggs in shrubs, along irrigation ditches which are shaded from the south, also from the strongest sunshine.

In such a wood margin I have found during 1½ hours more than 22 caterpillars of *P. multicaudatus* of various ages.

The young caterpillars begin to hatch about a week after the eggs are laid. Each has on its back two little white strips, which enlarge as the caterpillar grows, and resemble the white arms of a two-headed eagle. Immediately after hatching the caterpillar begins to eat the shell of the egg from which it came, and likewise begins to weave a silk mat on the surface of the leaf, such that the wind cannot suddenly sweep it off. Such a mat is made to the edge of the leaf, where the caterpillar begins to eat. This silk line is always made, even by big caterpillars, serving them as a thread of Ariadne, leading them to the desired spot.

At a constant temperature of 85° F., the caterpillars molt regularly at intervals of about 5 days. The following typical data are from records taken at Hat Creek, Shasta Co., California, in 1951:

Egg hatched	July 23
1st molt occurred	" 28
2nd " "	August 1
3rd " "	" 5
4th " "	" 9
Feeding ceased	" 15
Caterpillar began to change color, from green to brown	" 16
Pupa formed	" 18

Until the 4th molt the caterpillar is of a polished black color, but after that changes to green; the white eagle-like marking becomes very pale and finally disappears entirely. By the time for pupation, the caterpillar becomes brown.

When the caterpillar is ready to pupate it makes a little silk cushion on some nearly vertical surface, to which the cremaster hooks at the tail end of the pupa will be attached. These little claws on the cremaster serve to anchor the pupa securely. After this work, the caterpillar turns with the head upward and begins to weave around its back a very thin silk girdle, which in the future will attach the pupa to its surroundings. After the final molt, which occurs after the silk has been spun, the girdle cuts very deeply under the chitinous outer skin of the pupa. If you wish to remove the pupa from its resting place, you must first very carefully cut the girdle, then try to free the cremaster hooks from the silk cushion.

To obtain eggs from *P. multicaudatus*. one must take a box about 18" by 18" and 24" high. The front can be made of glass, but the other sides must be covered with fine wire screen to enable the butterflies to climb to the top, and also to provide fresh air, for the box must be kept in bright sunshine each day. It is best to add a branch or a piece of carton, to provide some shade in the cage.

The first problem is how to keep the cut branch in a living condition, as it will be in full sunlight for some days. For this purpose I have invented an apparatus called a "Turgorator", which produces artificially an almost normal turgor in the plant tissue (*Lepid. News* 8: pp. 121-123). The Turgorator enables a city dweller to take home branches from different plants, in a normal living condition.

Working with the Turgorator, we have to be sure there is always enough water in the can, as the cherry leaves lose much moisture by transpiration. It is helpful to wrap the Turgorator in a white towel, which prevents the sun from heating the water too much, and also gives the butterflies an opportunity to crawl to the leaves or branches.

A small vessel of water must be put in the cage with the butterflies, else they will die of thirst. For feeding them we can use different flowers, such as clover or thistle, but best of all is the Tiger Lily. The flowers of this plant are so attractive to female swallowtails that those of several species (*P. multicaudatus, P. rutulus* Boisd., *P. eurymedon* Luc.) will even lay their eggs directly on the blossoms and leaves, though they are not suitable food for the caterpillars.

It is not enough to provide flowers for the butterflies, however; we must give also sugar dissolved in water (about a 12% solution). Drops of the solution can be put on a piece of carton waxed with paraffin, or in the glass lid of a fruit jar. The butterfly should be taken by the forewings in one hand, while with the other we roll out its coiled tongue. You can tell when it has begun to drink the sugar solution, because it bends down its antennæ and nods its head. Then the wings should be released and the butterfly allowed to feed of its own accord. When it begins to roll up the tongue again, we should wash the organ in clean water, using a tuft of cotton, or simply by putting the butterfly under a little stream of water. Such a washing of the tongue and legs is necessary, for if left on, the sugar solution will make the legs fragile and will gum up the tongue. If the females have stopped egg laying we can feed them at one-day intervals, but in this case we must be sure that there is always fresh water available for them to drink. If females do not accept the sugar solution, it is an indication that they have not yet mated, as young ones before copulation eat only a small amount of food.

In sunny weather, females begin to lay their eggs after midday, older ones starting first. Leaves with eggs on can be picked, the eggs removed very carefully and each lot put in a separate glass jar.

Eggs which are nearly ready to hatch change their color and look like ripe apricots, then become still darker. At a constant temperature of 83° F., the young caterpillars are ready to hatch in seven days. To rear them we should have ready some glass jars 6 or 7 inches high and 4 inches wide, in each a little twig of Choke-cherry in a vial of water; the mouth of the vial around the twig should be stuffed with cotton so that the larvæ cannot fall in and drown. Five or six eggs may be put on the leaves of one twig, and six or seven jars will be needed for the brood from one female; the ripe eggs can be fastened to the leaves with white-of-egg, or saliva.

The young larvæ must be kept under constant observation and handled with great care, using a camel's hair brush. If they fall from the leaves, put them back at once with the brush. In such jars the larvæ can be kept until they have changed their skins, *i.e.* molted, for the third time. Then they should be transferred to glass cylinders a foot high and 6 inches wide.

The mature larvæ change their color from green to dark brown. At that time they must be put into other jars containing branches. Once a caterpillar has chosen a spot on a branch, spun a silk mat and attached itself by a girdle around its body, it and the twig must be placed in another glass into which no new larvæ are put. For just before their pupation, caterpillars are very uneasy, and can readily disturb those which are ready to pupate.

If we have the overwintering generation, the glass jars containing pupæ should be covered with wire netting, to prevent the entrance of mice during the winter.

The caterpillars of *P. multicaudatus* can be found on other plants as well as on Choke-cherry. But in Shasta County in northern California the females lay their eggs only on the leaves of Choke-cherry. If you want the butterflies to become constant visitors in your garden, you must try to provide suitable conditions. Thus there should be a small bed with flowers of Tiger Lily, and Choke-cherry bushes.

I am greatly indebted to Dr. RALPH HALL and Mr. F. P. KEEN for permission to use the facilities of the Hat Creek Forest Entomology Station, and to HUGH B. LEECH, Associate Curator of Insects at the Calfornian Academy of Sciences, who helped to prepare this article for print.

516 Cole St., San Francisco 17, Calif., U. S. A.

FIGURES OF TYPE SPECIMENS

At the meeting of the International Union of Biological Sciences held at Nice in August 1953, a type-figuring subsection of the Entomology Section was formed. The objective of the subsection is to make information on types of insects and other animals as readily available as possible, especially by distributing figures of the type specimens, to assist in research work and to have some information available in case types are accidentally destroyed.

The activities of the subsection are directed by a committee under the chairmanship of Mr. N. D. RILEY, Keeper, Department of Entomology, British Museum (Natural History), London, S. W. 7. Other members of the committee are:
B. P. BEIRNE, I. F. B. COMMON, W. FORSTER, J. G. FRANCLEMONT, H. INOUE, A. J. T. JANSE, O. LUNDBLAD, E. G. MUNROE, J. OITICICA FO., J. F. G. CLARKE, R. N. ORFILA, C. F. DOS PASSOS, R. SPÄRCK, and P. E. VIETTE.

The aims of the subsection are: to collect in a central file negatives of photographs of type specimens, or of photographs of drawings or other illustrations of type specimens or of their parts; to catalogue these and make lists available from time to time; to make and to distribute prints of the photographs for suitable fees to those requesting them;

and, when finances permit, to make or arrange to have made illustrations of types for the central file.

At present the headquarters of the Subsection and the Central File are located at Ottawa, where some facilities are being made available to assist in the organization and the initial stages of operation. The headquarters can be transferred elsewhere at some future date, if a more suitable location and more adequate facilities were made available.

The Subsection on Figuring Types now has available the first set of 50 photographs of type specimens of Lepidoptera. The set comprises 50 prints, representing upper and under sides of the following types of Rhopalocera in the Canadian National Collection of Insects:

No. 1/2 *Papilio brevicauda* Saund. Packard: *Guide Stud. Ins.* 245, 1869. CNC Type No. 832
3/4 *P. brevicauda gaspeensis* McD. *Can. Ent.* 66,84,1934. CNC Type No. 3735
5/6 *P. brevicauda bretonensis* McD. *Can. Ent.* 71,158,1939. CNC Type No. 4549
7/8 *P. machaon dodi* McD. *Can. Ent.* 71,216,1939. CNC Type No. 4913
9/10 *Parnassius smintheus sternitzkyi* McD. *Can. Ent.* 68,273,1936. CNC Type No. 4116
11/12 *P. smintheus olympiana* Burd. *Can. Ent.* 73,118,1941. CNC Type No. 5191
13/14 *Colias nastes subarctica* McD. *Can. Ent.* 60,271,1928. CNC Type No. 2863
15/16 *C. nastes streckeri* ab. *palliflava* McD. *Can. Ent.* 59,154,1927. CNC Type No. 2435
17/18 *Pieris beckeri pseudochloridice* McD. *Can. Ent.* 60,267,1928. CNC Type No. 2861
19/20 *P. napi mogollon* Burd. *Can. Ent.* 74,154,1942. CNC Type No. 5222
21/22 *Cœnypmha inornata benjamini* McD. *Can. Ent.* 60,272,1928. CNC Type No. 2888
23/24 *C. inornata insulana* McD. *Can. Ent.* 60,273,1928. CNC Type No. 2889
25/26 *C. inornata columbiana* McD. *Can. Ent.* 60,274,1928. CNC Type No. 2890
27/28 *C. inornata nipisiquit* McD. *Can. Ent.* 71,266,1939. CNC Type No. 4967
29/30 *C. ampelos mono* Burd. *Can. Ent.* 74,2,1942. CNC Type No. 5223
31/32 *C. tiphon mackenziei* Davenp. *Can. Ent.* 68,1936. CNC Type No. 4066
33/34 *Œneis chryxus strigulosa* McD. *Can. Ent.* 66,86,1934. CNC Type No. 3732
35/36 *O. jutta reducta* McD. *Can. Ent.* 61,105,1929. CNC Type No. 2955
37/38 *O. cairnesi* Gibs. *Rep. Can. Arc. Exp.* III,15 I,1920. CNC Type No. 834
39/40 *O. brucei yukonensis* Gibs. *Rep. Can. Arc. Exp.* III,15 I,1920. CNC Type No. 836
41/42 *O. semidea arctica* Gibs. *Rep. Can. Arc. Exp.* III,13 I,1920. CNC Type No. 835
43/44 *O. simulans* Gibs. *Rep. Can. Arc. Exp.* III,14 I,1920. CNC Type No. 854
45/46 *Erebia disa subarctica* McD. *Can. Ent.* 69,16,1937. CNC Type No. 4118
47/48 *E. fasciata* ab. *suffusa* Warr. Warren: *Mon. Gen. Erebia*, 180,1936. CNC Type No. 4119
49/50 *Argynnis cybele novascotiæ* McD. *Can. Ent.* 67,18,1935. CNC Type No. 3859

At present, because of limitations of staff, photographs can be sold only in sets, price $4.00 per set. Orders and inquiries should be addressed to the Curator, Mr. P. F. BRUGGEMANN, Science Service Building, Carling Avenue, Ottawa, Ontario, Canada. Cheques may be made payable to the International Union of Biological Sciences.

EUGENE G. MONROE, Science Service Bldg., Ottawa, Ont., CANADA

[Editor's note: Dr. MUNROE has just notified us that series 2-8 of figures of North American types in the Canadian National Collection are now available and lists of these can be obtained from Mr. BRUGGEMANN.—C.L.R.]

FIELD NOTES

A NATURAL CYNTHIA — CECROPIA MATING

During the winter of 1954-5 some fifty cocoons of *Samia walkeri advena* Pack. (*cynthia* auctt.) had been accumulated for the purpose of examining the emerging imagoes for aberrant forms. Customarily each evening normal individuals were tossed in the general direction of a Forsythia bush near the door of my study at Washington, Connecticut, and no further interest demonstrated in their welfare except the hope that the species might become established in these environs. At about nine o'clock on the morning of July 8, as I emerged from my study, thoughts of the five specimens I had catapulted towards the bush the night before came to mind, and I determined to investigate whether any specimens still remained. Even as I approached, my casual glance startled me. There in full broadside view was a copulating pair of Saturniids, but it required a "doubletake" on my part to comprehend the picture. What I was seeing was surely a female *S. walkeri* released the previous night, but who was her strange partner? There was no mistaking the situation. A robust male *Platysamia cecropia* Linné had successfully wooed the fair lady, presumably winning out over ostensibly more eligible suitors. I feel certain she had entered her freedom in the company of two or more males of her kind, not to mention those released on successively earlier days.

Not knowing how long they had been paired, I did not wish to chance disturbing them so decided to insure against predators by remaining a few hours in the garden near at hand. I might as well be candid—my wife had told me in no uncertain terms to get around to mowing the lawn that very morning. At noon I risked moving them to a large screen cage, accomplishing the task without mishap. They remained together until after 9:30 P. M. when I left the house. Upon my return three hours later they had parted. By the next morning there were already many eggs. More were laid the following two nights, during which nights, I might add, I dreamed of Lepidoptera with various patterns intermediate between the species, not to mention some with gaudy features known to neither, or for that matter, any moth. As the days passed I excitedly examined the eggs at ridiculously frequent intervals. Tension mounted to a peak as the seventh, eighth, and ninth days came by. The suspense was terrific.

No doubt, you have guessed the end of the story as, in truth, had I long before. It had been too much to hope for. Judging from the progressive collapse of the eggs as the days passed, the embryos, if formed at all, never developed to any extent. Unfortunately, I neglected to make a microscopic examination.

SIDNEY A. HESSEL, Nettleton Hollow, Washington, Conn., U. S. A.

ZEUZERA AND *ADOPÆA* IN KENTUCKY

During the season's collecting (1955) in Rockcastle Co., Ky., two unusual records were made. On July 15, 20, and 21 specimens of the Leopard Moth, *Zeuzera pyrina* Linné (Cossidæ), were taken, and another was reported seen by another observer. On Aug. 21 a specimen of the European Skipper, *Adopœa lineola* Ochs. (Hesperiidæ), was taken.

RALPH BEEBE, Renfro Valley, Ky., U. S. A.

AN APPARENT MIGRATION OF THE MOURNING CLOAK

On September 8, 1955, along the Jones Beach Parkway which parallels the ocean shore on the south side of Long Island, I encountered thousands of the larger dragonflies, particularly *Anax junius,* migrating along the coast toward the mainland. A few Monarch butterflies (*Danaus plexippus* Linné) drifted in the same direction. But what was especially surprising was a definite movement of the Mourning Cloak (*Nymphalis antiopa* Linné). Between the water tower and Captree, a distance of fifteen miles, I saw twenty-five Mourning Cloak butterflies all flying in the same direction as the Monarchs and the dragonflies, toward the western end of the island. One of the insects, moving beside the road and parallel to it near Gilgo Beach, was advancing at a speed of fifteen miles an hour. All the Mourning Cloaks were flying steadily, all were flying in a straight line, all were moving in the same direction.

This is the first instance I have encountered of any mass movement by these butterflies. As it is well known that they spend the winter in hibernation, often appearing during thaws in February and March, this concerted movement along the coast has special interest. Usually hibernation takes place in hollow trees and among woodlands. As there are no large trees or stretches of old woodland in the area, perhaps this was a partial migration, a movement toward more favorable hibernating areas.

On this particular autumn on Long Island the number of Mourning Cloaks seems to have been unusually large. EDMUND MORGAN, Curator of Nassau County's Tackapausha Museum, at Seaford, reports that when watermelon rinds were left in a yard temporarily after a social event at Millville, L. I., about the first of September, they attracted considerable numbers of Mourning Cloaks. As many as thirty or forty of the butterflies clustered on one rind at one time.

EDWIN WAY TEALE, 93 Park Ave., Baldwin, L. I., N. Y., U. S. A.

A *PAPILIO* FLIGHT PATTERN

Back in 1953, May 30 and 31, I collected butterflies about six or seven miles west of Ramsey, Illinois, Fayette County, Hurricane Township, and I made the following observation on the flight habits of some swallowtail butterflies. I saw several *Papilio philenor* L. and *P. troilus* L. exhibiting this curious flight habit on both days. These swallowtails seemed to prefer to fly along the northern edge of some woods known as "The Lost 80", mostly in an east-west direction. Very few went north or south. They flew in the shade and not along the road which ran along the north edge of "The Lost 80", since it was in the hot sun. These woods are one quarter of a mile east and west by one half of a mile north and south. These particular butterflies flew east to the edge of the woods and would turn around and fly back to the west edge, turn around and fly back again. Back and forth they kept up this procedure all day long for both days. Deeper into the woods there were no swallowtails. I did not investigate the south edge. Incidently, I have collected in this territory previously and since and have observed this curious habit only this one time.

As to the other kinds of swallowtails present here I might add that I saw on the first day eleven *Papilio glaucus* L. and one *P. cresphontes* Cram. These showed no particular flight patterns. But on the second day I saw six *P. glaucus* L., and all were flying either to the north or south. Three flew to the north and one south; the other two came northward through "The Lost 80" woods, turned around at the road, and flew back southward.

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ESPECIALLY FOR FIELD COLLECTORS

(Under the supervision of JAMES R. MERRITT)

MY HIGHEST CATCH OF BUTTERFLY SPECIES IN A SINGLE DAY: DIGNE (FRANCE), 6TH AUGUST 1926

Dr. C. L. REMINGTON'S interesting note on the highest number of butterfly species taken by him in a single day and his invitation to readers of the *Lepidopterists' News* to send in notes of their experiences in this matter prompted me to turn up my collecting diaries to see what was the largest number of species which I had ever taken in a single day. This proved to have been fifty-six species taken by me at Digne in France on 6th August 1926.

By way of explanation I should perhaps say that I have always made a full record of the species caught on every day of collecting and, being interested in faunal problems, I have always tried to take (or definitely establish the identity of) every species occurring on that day. On the other hand, I have never set out to see how many different species I could find in a single day, preferring on any given day to concentrate upon some limited area and to search adjoining areas of a different character on some other day. The actual area in which I collected at Digne on 6th August 1926 was the lower portion of the Vallée des Eaux-Chaudes, a bare valley which lies less than two miles to the east of the town. The whole area collected in on that day was not more than a few miles in length and I have no doubt that, if it had been my object on that day to obtain the maximum number of different species, I could have caught a larger number by spending less time in the Eaux-Chaudes valley and using the time so saved for visiting rather different localities nearby.

Digne is probably the richest collecting ground in Europe for butterflies. It lies at an elevation of 1955 feet on a plateau of Miocene age, backed on the north-west and south-east by higher ground made of lower and middle Jurassic overlaid by a narrow strip of Upper Trias running in the same general direction. There is much still to be learned regarding the distribution of butterflies in France, but from published and other material there is no doubt that the Basses-Alps, the Department of which Digne is the administrative capital, is the home of a larger number of species of butterflies than any other Department in France. The time of year — the end of the first week in August — when I made the catch now described is not that which I should have chosen, it being dictated by other preoccupations. It is likely that the date on which the maximum number of species is on the wing at Digne is somewhere about 20th July in a season of normal weather, for at that date worn examples of a larger number of early summer species are still to be found, though in bad condition, while most of the late summer species which were fresh on 6th August 1926 would probably have started to emerge.

The significance of the total number of species observed on a single day naturally must be judged against the total number of species occurring in the locality during the year. In any estimate of this kind there must be some element of doubt when, as here, it is necessary to rely in part on old published records. Moreover, there will be slight differences in the totals obtained by different workers according to the view which they take on the species-problem. In the group on which old records are most likely to be unreliable — the *Pyrgus* skippers — account has been taken only of species of which there exist authentic specimens, the specific identity of which has been established by an examination of the male genitalia. Subject to these reservations it may be estimated that about 175 species occur in the Department of the Basses Alpes; a considerable number of these are high-elevation species which could not exist at so low an elevation as Digne. The total number of species recorded as having been taken at Digne or in its immediate neighbourhood is about 135. Of these, between 15 and 20 are early spring species and another seven occur only at considerable elevations in the Dourbes mountains to the north-east of the town. Thus, the total number of species which might be on the wing at Digne itself in the first week of August is about 110; of these a considerable number would be almost over and only a few worn specimens could be expected. Actually, as already stated, we took 56 species on 6th August 1926, or only a little over one-half of the maximum which with the utmost of luck we might have obtained. It was a very hot day and butterflies swarmed in the Eaux-Chaudes valley. The most numerous in examples were the large Satyrids of the group formerly placed together in the genus *Satyrus* (of which we obtained specimens of all the eleven species known to occur in the locality) and some of the Blues, notably *Lysandra coridon.*

The following is a list of the 56 species that we took:

SATYRIDÆ. — *Pararge megera, Melanargia galathea, Hipparchia fagi* (*hermione*), *H. ælia* (*alcyone*), *Aulocera circe, Eumenis briseis, E. arethusa, E. semele, E. statilinus, E. fidia, Satyrus actæa, S. ferula* (*cordula*), *Minois dryas, Maniola tithonus, M. jurtina, M. lycaon, Cœnonympha dorus, C. pamphilus* (18 species).

NYMPHALIDÆ. — *Argynnis paphia, Fabriciana adippe, F. charlotta* (*aglaia*), *Clossiana dia, Brenthis daphne, Melitæa cinxia, M. phoebe, M. didyma, Mellicta deione, M. athalia* (*pseudathalia*), *Vanessa cardui* (11 species).

LYCÆNIDÆ. — *Lycæides idas, Polyommatus icarus, P. meleager, Lysandra dorylas, L. coridon, L. bellargus, L. escheri. L. thersites, Agrodiætus damon, A. ripartii* (formerly misidentified with *admetus*), *L. phlæas* (11 species).

PIERIDÆ. — *Leptidea sinapis, L. duponcheli, Aporia cratægi, Pieris napi, P. rapæ, Colias australis* (formerly misidentified with *hyale*), *C. crocea* (*edusa*), *Gonepteryx rhamni, G. cleopatra* (9 species).

PAPILIONIDÆ. — *Iphiclides podalirius* (1 species).

HESPERIIDÆ. — *Pyrgus foulquieri, P. cirsii* (formerly misidentified as *fritillum*), *P. fritillarius* (*carthami*), *Ochlodes faunus* (*sylvanus*), *Hesperia comma, Thymelicus acteon* (6 species).

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EDITORIAL ANNOUNCEMENT

The last issue of the *News* marked the beginning of a new section devoted to matters of interest to amateur collectors. When the Lepidopterists' Society was founded there appeared a stream of excellent articles of interest to both amateur and professional lepidopterists. Gradually as the *News* became an accepted scientific journal these popular articles were replaced by more technical contributions. Various members of the Society wrote to the Editor protesting the reduction of material with general appeal. One correspondent noted the value of an article on gonadal transplantation in *Lymantria dispar* (*Lepid. News* 7:7-8) but lamented that even for some common butterflies he could not distinguish males from females. Other members called for more articles like the ones on *Erora læta* (*Lepid. News* 6:34), the search for *Speyeria egleis secreta* (*Lepid. News* 2:81-82), and the use of baits (*Lepid. News* 6:32-33). As a consequence the Editor appointed a committee to promote a special section of the *News* designed to appeal to the many enthusiastic collectors whose attention is not centered on the most technical side of lepidopterology. This committee consists of RICHARD GUPPY of British Columbia, GEORGE EHLE of Pennsylvania, and JAMES MERRITT of Kentucky.

Among the things which the committee has been considering are articles on techniques, field observations, brief biographies of noted old lepidopterists, descriptions of famous collecting localities, definitions of terminology, and simple discussions of theory such as protective coloration, but the committee would appreciate suggestions from the readers as to the kinds of articles they would like to see.

Granting that the right types of articles can be found, a second objective of the committee is to provide a forum for a discussion of interesting topics. It is the belief of the committee that not uncommonly the energetic amateur may make some observation in the field or in his vivarium or in caring for his collection which would be a valuable contribution to knowledge, but the amateur hesitates to write up the contribution because the item is small or because he thinks that his observation is probably already known to the expert. In this section, no contribution is too small. As to the second point, that the contribution may represent information generally known, bear in mind that this section is aimed in part at the less experienced collectors. The professional expert is not excluded; indeed, the committee contemplates that many of the problems will have to be referred to the experts, but it is hoped that articles or questions will provoke a running commentary among the members of the Society, both amateur and professional.

The committee is approaching its task with considerable trepidation and plans to be guided by the response of the readers. The committee recognizes that most of the readers of the *News* are not absolute tyros but at the same time there appears to be a middle ground along which the coverage of the *News* might expand if there is sufficient interest. Consequently it is imperative that the members of the Society pass on to us their suggestions. What kinds of articles would you like to see in this section? What problems do you want discussed? If you have any questions, problems, or suggestions, please send them to the undersigned at: School of Law, University of Louisville, Louisville 8, Ky., U. S. A.

JAMES R. MERRITT

MINUTES OF THE SECOND PACIFIC SLOPE MEETINGS OF THE LEPIDOPTERISTS SOCIETY, SEPTEMBER 3 - 5, 1955

The meetings were held in the lecture room of the San Diego Society of Natural History Museum, San Diego, California. Through the cooperation of Colonel ARTHUR FISCHER and his staff, pleasant and adequate facilities were made available for all activities.

Starting September 3, the time from 9:30 to 11:00 was spent in registration and renewing of acquaintanceships of the members and guests, many of whom had not had this opportunity since the meeting in San Francisco the previous year.

At 11:00 the formal program was launched under the chairmanship of Dr. JOHN A. COMSTOCK. An address of welcome was delivered by Colonel FISCHER, greeting the Society and pointing out the importance of scientific investigation toward knowledge and enjoyment of the natural sciences.

The next order of business was the choosing of the area for the field collecting trip for the following day. It was unanimously decided to cover the desert area east of Julian, in the general region of San Felipe Creek. The decision was based upon the fact that heavy rains had brought out the vegetation on the desert.

The kind invitation of Mr. FRED THORNE to meet for an evening discussion at his home in El Cajon was enthusiastically accepted by the members. In the time remaining before lunch a group picture was taken.

Upon returning from a pleasant lunch, the article "Collecting Notes on *Megathymus*," by HUGH A. FREEMAN was read by J. W. TILDEN. This paper gave practical information on collecting and rearing these specialized insects. A lively discussion developed, as several of the members present had worked with this genus. The general opinion by the members was that a great deal of work remained to be done on these insects.

The next subject was "Interesting Collecting Spots in Lower California," by CHAS. F. HARBISON. Slides were shown of outstanding collecting areas, and Mr. HARBISON commented on the possibilities. There is a series of sub-tropical and tropical oases stretching nearly a thousand miles down the Peninsula. Each has its peculiar ecological conditions. The area has not been thoroughly covered by collectors, and no doubt new forms and even species remain to be discovered. For instance, there are 21 varieties of Agave represented, and almost surely new forms of *Megathymus* will be found by careful investigation.

ROBERT L. LANGSTON reported on "Western Tent Caterpillars and Their Parasites." The species and the variation of the moth and the caterpillar were discussed and a display cabinet of hosts and parasites were shown. Mr. LANGSTON indicated that though caterpillar parasites were important, the egg parasites were more effective from a control standpoint.

The last paper of the day was presented by Mr. FRED THORNE, on the Season Summary. Some challenging points were raised on the makeup of the present summary and upon a motion by Dr. COMSTOCK, seconded by Mr. SALA, a resolution was passed unanimously to send Mr. THORNE'S paper to Dr. REMINGTON. The motion was amended to ask for inclusion of sub-specific names for the Western reports only.

A film was shown on The Grape Leaf Skeletonizer, prepared by The California Bureau of Entomology. This moth threatens the grape industry of the state.

The group adjourned for a delightful dinner at Cafe del Rey Moro, in Balboa Park. After dinner the members drove to the home of Mr. THORNE for informal discussions and refreshments. A feature of the evening was the examination of some remarkable specimens in our host's collection.

The following day, Sunday, was dedicated to the field collecting trip. Cars met at 8:00 A. M. at El Cajon, and by 10:00 were in the vicinity of Scissors Crossing, on San Felipe Creek, approximately 70 miles east of San Diego. This spot was selected as representing the typical desert condition in this area. The heaviest rains of many years had preceded our visit by about 3 weeks. Vegetation was in full growth, plants and shrubs in full leaf, flowers in bloom, and running water in the stream bed. Insects of many types were abundant, and Lepidoptera conspicuously present. To many of us, uninitiated in the peculiarities of the Southwest, the sight of the desert in bloom will always remain as a surprise and a revelation.

Collecting was excellent, both in numbers and variety. Some of the species taken were: *Papilio rudkini, Melitæa chara, Hemiargus gyas, Apodemia mormo deserti, Cœnonympha californica, Brephidium exilis, Pieris protodice, P. beckeri, Danaus gilippus strigosus, D. plexippus. Eurema nicippe, Polites sabuleti, Colias eurytheme, Apodemia palmerii marginalis.* Three unexpected catches were *Euptoieta claudia, Libytheana bachmanii* and *Pseudocopæodes eunus.*

Meetings convened again in the Museum on Monday morning at 9:30. Dr. HOVANITZ was prevented at the last minute from attending the meeting. F. MARTIN BROWN kindly acted as moderator in the discussion "Geographical Variation." He laid the background of the subject by pointing out that there are many mysteries connected with the occurrence of variation. To fully explain the phenomena we may have to draw on sciences outside of biology. Among others, the effect of past geologic and climatic conditions may well be essential. The migration of forests and other vegetation, based on past temperature and rainfall may have much to do with the present distribution and isolation of species and sub-species.

At this point, Mr. JOHN DOWNEY took up the discussion by presenting data on *Lycæides argyrognomon.* After defining terms he discussed the existence of basic variability tendencies in the gene pool of the species. In *melissa,* for instance, a clinal relationship exists from Canada to Southern California in genitalic characters. However, wing pattern does not follow the same trend. What factor is causing this variation? A table was shown on the occurrence of a specific spot on the fore wing. This showed an occurrence of 78% in the White Mountain variety to 0% for the Argus variety. Mr. DOWNEY asked for more data from collectors to help in working out these relationships.

Dr. J. W. TILDEN then presented data on the genus *Ochlodes.* Many of the life histories are missing in this genus, and some sub-species are not named. Even the status of some, such as *O. nemorum,* are in question. Some members of the genus, although widely distributed, show little variation. Examples are *O. yuma* and *O. morrisoni.* Others are highly variable. The *agricola* and *sylvanoides* complexes are examples of this. *O. sylvanoides,* particularly in California, shows great variation, even in genitalia.

Mr. THORNE at this point read a paper by DAVID L. BAUER on "Geographic variation in *Melitæa hoffmanni.*" Slides were also shown, illustrating the variation in size and color of this species in various localities.

A summation was given by Mr. Brown pointing out the small sample of the total population on which much of our work is necessarily based. More reports from collectors will help this. The wandering of species in following their food plant may bring them into new climatic conditions leading to variation and the development of a new subspecies. An example was given from Colorado, where a colony of *Papilio indra* became established. This isolated colony showed a few long-tailed examples in 1923, but by 1940 99% had long tails.

The next subject presented was "Highlights of the 1955 Season" by Mr. Lloyd Martin. The 1955 season was marked by very wet conditions on the desert. Apparently Mexican weather patterns moved north into the Southwest. This gave very good collecting conditions and led to a number of new records. The season was three weeks late in the Sierra due to a cold spring. Conditions in northern California were below average due to an unusually dry season.

A very interesting discussion developed around the questions of how far specimens could be blown by storms, and still be in good condition. It was agreed that 500 miles was not excessive, and was the explanation of some of the unusual catches recorded in 1955.

The last paper by Dr. Harry Lange on "Aquatic Pyralids," was read by Mr. Martin. This reviewed further work on this interesting group and showed that they are far more prevalent than generally thought.

With the reading of the last paper the closing items of business were taken up. Upon a motion by Mr. Brown, seconded by Mr. Thorne, a resolution was passed thanking the San Diego Museum for their cooperation.

After some discussion, it was agreed unanimously to hold the 1956 meeting in Santa Barbara the first week in August.

Upon a motion by Mr. Downey, seconded by Mr. Martin, a motion of appreciation was passed for the work of Mr. Thorne for his work as program chairman. An amendment to the motion appointed Mr. Thorne chairman of the 1956 meeting.

Upon motion by Mr. Downey, seconded by Mr. Ford, a resolution was adopted thanking Mr. Tarô Iwase and his associates in Japan for their interest and cooperation in the 1954 and 1955 Pacific Slope meetings.

Recommendation was made that Donald Patterson as secretary send letters to authors of papers submitted in absentia, thanking them for their contributions.

The meeting was adjourned at 3:00 P. M.

The following members and guests registered for the meeting:

J. W. Tilden
Fred Thorne
J. A. Comstock
Robert L. Langston
Donald Patterson
R. W. Breedlove
Paddy McHenry
William A. Rees
John C. Downey
Lloyd M. Martin
Jerry Powell
J. McKenney

J. C. Spencer
W. L. Phillips
Paul A. Gerhardt
Charles F. Harbison
Mr. and Mrs. Frank Sala
Robert J. Ford
F. Martin Brown
Bill Patterson
Colonel Arthur Fischer
F. X. Williams
Paul H. Arnaud

Donald Patterson
Secretary *Pro Tem.*

PRESIDENTIAL LETTER TO THE SAN DIEGO MEETING

Rio de Janeiro, September 12th of 1955

Dear Fellow Members,

I should have been very happy to have been with you in person on the occasion of the recent meeting of the San Diego section of our Society.

Notwithstanding the fact that I remained unaware of this meeting until several days after it had taken place, the delays and difficulties of long distance foreign travel would no doubt have prevented my attending. I must rely therefore, as others have done, on the written or printed word to convey to all of you my personal greetings and to express my heartfelt thanks for the honour you fellow members have done to me by electing me as your President. Indeed while I feel I have done little personally to deserve it, the distinction which has fallen this year on a Brazilian member will also be reflected in the satisfaction shared by our resident members in Brazil. We are but very few, it is true, compared to the legions of both amateur and professional entomologists in your country, but this, as a small group, brings us closer together.

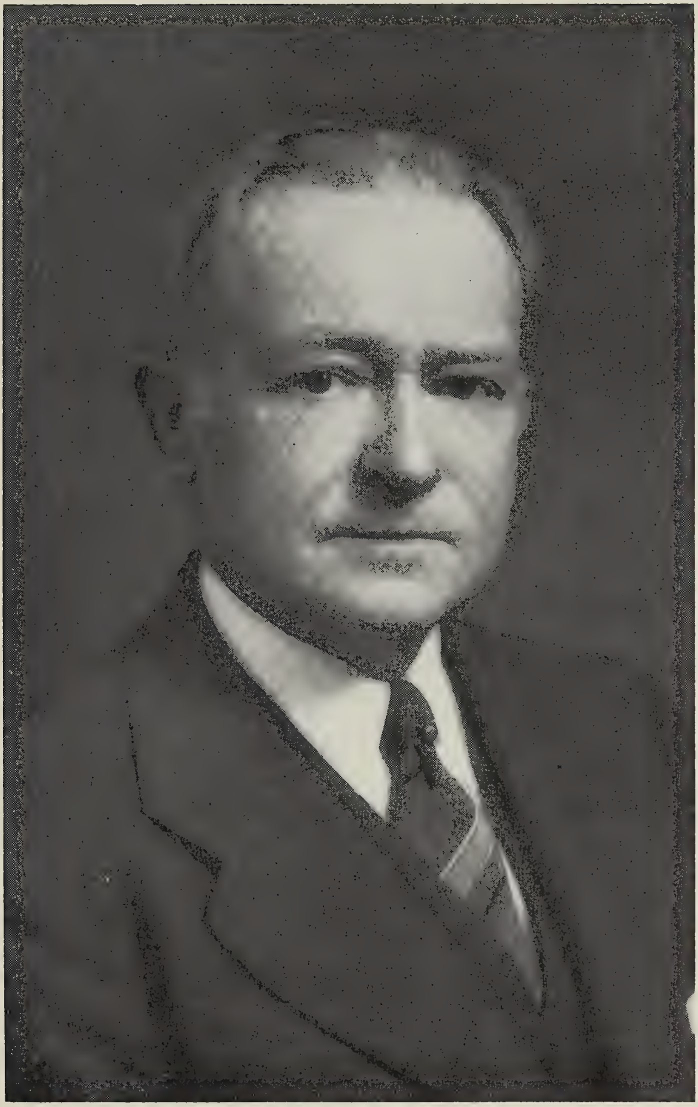
It has always been my aim to widen our local circle and bring in new adepts to our lepidopterological pursuits but, of course, in a country where in spite of its exuberance the lovers of nature are fewer in proportion to the educated population, progress tends to be much slower. To compensate for numbers I have tried to form new adepts to the study of Lepidoptera on the basis of modern techniques of dissection and the analysis of the genital organs. Addressing myself in particular to our younger fellow members everywhere I recommend to those who are interested in taking up the systematics of Lepidoptera seriously to use as much as possible the characters provided by the internal genital organs in order to define groups and species. Such methods, for instance, have revolutionized the systematics of the Mosquitoes and brought order out of virtual chaos. In my own group of Lepidoptera, the Arctiidæ. which has been revised by entomologists of renown, I have been able to establish real affinities between species formerly allocated to different genera or even to different families (Ctenuchidæ from Arctiidæ in many instances).

While I recognize that the degree of definition provided by genitalic preparations varies according to families or even smaller groups in the Lepidoptera, I believe that even in cases where the genitalia have been considered to provide few characters for the differentiation of species, the solution lies in better techniques rather than in the switch to other and external morphological characters.

Next week I will be leaving Rio on a collecting trip to the interior of Brazil; this will be the third trip in three months of a series planned to cover a completely unexplored part of our vast country, entomologically speaking. Such a trip which would have taken months of hardships and even considerable danger, now can be undertaken in relative comfort and short time thanks to the airplane. Our Airforce has recently built several emergency airfields and radio direction stations for the convenience and saftey of both home and international airlines. With the cooperation of our Airforce who have provided the transportation, I am able to take advantage of these nests of civilization in the wilderness. Unfortunately the drought which prevailed on the two previous trips made the yield a very small one. The rainy season is about due now, and I am hoping therefore to obtain this time much hoped for novelties as well as other interesting material for study.

Dear fellow members, perhaps some day in the not too distant future I will be able to visit your country with its wealth of scientific establishments and great museums. If this happens I will have the pleasure of meeting some of you personally and becoming better acquainted; if this cannot be, then at least for a brief moment you will have shared my thoughts and spirit.

Yours very truly,
LAURO TRAVASSOS
Instituto Oswaldo Cruz, Rio de Janeiro, BRASIL



AUSTIN HOBART CLARK

The recent death of Mr. AUSTIN H. CLARK was a great loss to the world of lepidopterists and of biologists in general. He was born on December 17, 1880, at Wellesley, Massachusetts, and grew up a typical New Englander. Before he entered Harvard, he attended Newton High School and Cutler's School in Newton. His interest in Lepidoptera developed when he was a boy, and among his possessions until his death were specimens of butterflies taken during his high-school days. Mr. CLARK graduated with an A. B. from Harvard at the age of 23, and three years later he married MARY WENDELL UPHAM, who in later years, joined, along with their five children, in his interest in natural history. His first wife died in 1931. In 1933, he married LEILA GAY FORBES, who closely shared CLARK'S interests. She became joint author with him of eight papers on the butterflies of Virginia, and she survives him. Mr. CLARK is also survived by a sister, ROSAMOND CLARK of Boston, and nine grandchildren.

During the years 1906 and 1907, CLARK was the Acting Chief of the Scientific Staff of the U. S. Bureau of Fisheries Steamer, Albatross. For eight months in 1906 he participated in a Pacific cruise, and his first report upon his return was on the birds he studied during this period. In 1908, CLARK joined the Smithsonian Institution, an association which lasted until the end of his life. He was first appointed Assistant Curator of the Division of Marine Invertebrates of the U. S. National Museum, and in 1920 he was made Curator of Echinoderms, the position which he held for 30 years.

AUSTIN CLARK'S scientific and cultural interests were remarkably broad, and it is not surprising that among his proteges of the younger generation are men in such diverse areas as botany, medicine, zoology, and journalism. During his active life, CLARK wrote 630 books and articles in English, German, French, Spanish, Russian, and Hebrew. Although most of his articles were published in the United States, the places of publication of this cosmopolitan author included some twenty different countries. Among his books are *Animals of Land and Sea, Nature Narratives* (vols. I and II), *The New Evolution—Zoögenesis,* and *Animals Alive,* along with a number of major works on the echinoderms, particularly the crinoids, which constituted his principal research field. While he is generally considered one of the world's primary authorities on echinoderms, he found time for research in other groups, among them birds, butterflies, and the peculiar animals of the genus *Peripatus* and its relatives. CLARK'S interest in the last began around 1910 and continued until the end of his life, resulting in twelve published papers. Besides the zoological groups upon which he undertook active investigation, he was keenly aware of other phases of biology, and he frequently surprised his numerous close friends with his special knowledge of problems seemingly far from his own research, including even botanical matters. It was this breadth particularly which made him peculiarly suitable for his role in influencing the popularization of science and scientific journalism.

AUSTIN CLARK was a man of sparkling humor and quick wit. Of medium height and pleasant, dignified manner, he spoke with an unusually deep voice and with a "Harvard accent". In his office at the National Museum, his desk and tables were piled high with innumerable papers and books, the whereabouts of each one of which he seemed, mysteriously, to know precisely. He was always ready to drop his labors for a visitor whether the visitor were a distinguished traveller from abroad, or a local boy of twelve years interested in finding out what his specimen was.

His facility for facts and anecdotes became legendary around Washington. One of the stories tells of a discussion in the Cosmos Club, of which he was a member: Some of the members were trying to decide whether to purchase for the Club a set of the *Encyclopedia Brittanica* for reference. One member spoke up, "But why bother—we already have AUSTIN CLARK."

During the 1930's, CLARK was Director of the Press Service of the American Association for the Advancement of Science. He was much interested in encouraging clear scientific writing, and in popularizing the work of the scientist. He was one of the first to realize the application of radio and television to the dissemination of scientific news and ideas. He was highly contemptuous of careless and misleading reports of scientific work in the popular newspapers and magazines, and his goal was accuracy in scientific journalism. With respect to style and clarity of writing, he had high standards and his own work was exemplary.

During the Second World War, CLARK was especially helpful to those naturalists in the military and naval services who found themselves in exciting biotic areas of the world, and who were able to collect specimens. Many of the specimens of plants and animals which were gathered by servicemen found their way to the U. S. National Museum as a result of his help and encouragement to the collectors.

CLARK has been commemorated appropriately by his fellow zoologists in that three genera of animals were named for him, and at least twenty-eight species.

He was active in many organizations: he was an Honorary Member of the National Association of Science Writers, a Fellow of the Royal Geographic Society, a member of the Long Range Planning Commission of the Southern Association of Science and the Virginia Academy of Science, and a member of the Cosmos Club of Washington, D. C. In 1921, he was the Scientific Aid-de-camp to the Prince of Monaco when the latter visited Washington. CLARK was decorated Knight of the Order of Dannebrog by Denmark. In 1926, he became Secretary of the Section of Oceanography, American Geophysical Union; and in 1928, he became chairman of the Section. He was active also in other organizations and councils, too numerous to list. In 1947, CLARK was President of the Entomological Society of Washington; and he was also a leading member of the Lepidopterists' Society. He was Vice President *pro tem.* of the Lepidopterists' Society in 1950 during its constitutional organization. He presided at the first annual meeting of the Society, which was held in New York, and was the First Vice President for 1950 when the first officers were elected.

For a man who was not a university professor, CLARK had remarkable influence on the younger generation, and is probably more or less directly responsible for the entrance of a number of present-day biologists into the profession. Young scientists and young hopefuls considered his office in the National Museum and his home at 1818 Wyoming Avenue as places of inspiration and encouragement. CLARK'S tutelage, however, was actually accomplished as much through his delightful letters as it was through personal contact, and his "boys" were scattered far away among the states.

Over 65 of CLARK'S papers, approximately one-tenth of his published works, were on butterflies. During the period of 1908 to nearly the time of his death, he collected buterflies from Massachusetts to Florida, although he specialized in the butterflies of the District of Columbia and Virginia. Over 150 people, including his sons, joined him on his numerous collecting trips, but in later years his constant companion was Mrs. LEILA FORBES CLARK, for whom he named a new form of the Gold-Banded Skipper, *Autochton cellus leilæ,* and with whom he made numerous discoveries concerning the butterflies of Virginia. "Butterflies of the District of Columbia" was one of CLARK'S major contributions to the knowledge of North American butterflies. He began the study of District butterflies when he first became a resident of Washington, in 1908, and for the following 24 years he observed the very considerable changes in the faunal balance. A number of species became progressively more rare or limited in occurrence during this period. He regarded the District area as a sort of meeting ground for northern and southern, and mountain and coastal plain forms. One of the primary values of his study of District butterflies is its detailed treatment of habits and seasons of the species.

During the course of his studies of the buttterflies of this general area, including Maryland and Virginia, he encountered a number of species at their southern limits, and discovered that in some the local forms were morphologically strikingly distinct from their more northerly counterparts. *Boloria selene marilandica, Polygonia faunus smythi,* and *Poanes massasoit hughi,* for example, are well-marked types of interest in forming extremes of clinal variation running far to the north, and culminating in northern forms of greatly different aspect.

CLARK'S investigation of the butterflies of Virginia extended from 1933 to 1951. With Mrs. CLARK, he regularly spent his annual leave of two weeks or more in some interesting area of Virginia. These periods, combined with innumerable weekends devoted to the work, enabled them to visit each of the 100 counties of the state at last twice. Their personal records included 800 different localities in the state, and in "Butterflies of Virginia" (1951) each species known from the state was discussed in detail from standpoints of range, occurrence, seasons, and variations.

CLARK'S lepidopteral interests, however, were by no means confined only to collecting and studying butterflies locally. He spent much time in the study of the large, general Lepidoptera collections of the U. S. National Museum. He investigated the odors of living butterflies, and their scent-scales and scent-glands. The effects of the radiation from butterfly wings on photographic plates were examined, and he published 40 photographs illustrating his experiments (in *U. S. National Museum Bull.* 157, plates 59-64; 1932). He was concerned with the broad relationships of butterflies as illustrated by his opinions on the groups within the superfamily Nymphaloidea, as well as with relationships at the subspecific level, as illustrated by the reports of his studies of *Papilio machaon* and *Danaus plexippus.*

AUSTIN CLARK retired in 1950 at the age of 70. He was then made an Honorary Associate in Zoology of the Smithsonian Institution, and he continued his researches until 1954. His death on October 28, 1954, marked the end of a great zoological career, and the loss of a wonderful friend, colleague, and mentor to all those who knew and loved him.

PUBLICATIONS ON LEPIDOPTERA BY AUSTIN H. CLARK

1913. Three interesting butterflies from eastern Massachusetts. *Proc. U. S. Nat. Mus.* 45: 363-364, pl. 12.

1925. Some unusual and interesting butterflies from eastern Massachusetts. *Psyche* 32: 293-298.

1926. Carnivorous butterflies. *Smiths. Inst. Ann. Rept. 1925*: pp. 434-508, figs. 1-5.

.... Notes on the odors of some New England butterflies. *Psyche* 33:1-5.

.... Our giant moths. *Sci. Monthly* 23: 385-397, figs. 1-19.

1927. Fragrant butterflies. *Smiths. Inst. Ann. Rept. 1926*: pp. 421-446, pls. 1-13.

.... Notes on the melitæid butterfly *Euphydryas phaëton* (Drury) with descriptions of a new subspecies and a new variety. *Proc. U. S. Nat. Mus.* 71: 1-22, pls. 1-5.

1928. Notes on some butterflies from New England. *Psyche* 35: 226-228.

1929. The butterflies of the District of Columbia. *Smiths. Inst. Explorations and Field-Work, 1928*: 101-108, figs. 89-93.

.... Why a butterfly? [and 21 other brief popular articles on insects]. In his *Nature Narratives* 1: 47-107.

.... On certain forms of common American butterflies. *Psyche* 36: 28-33.

.... Preliminary list of the butterflies of the District of Columbia. *Proc. Biol. Soc. Wash.* 42: 113-116.

1930. Notes on some local butterflies. *Proc. Ent. Soc. Wash.* 32: 80-82.

.... The world and the butterfly. *Sci. Monthly* 30: 536-537.

1931. Bachelor butterflies [and 14 other brief popular articles on insects]. In his *Nature Narratives* 2: 56-82.

.... Some observations on butterfly migrations. *Sci. Monthly* 32: 150-155.

.... Notes on the behavior and migration of the Milkweed Butterfly. *Journ. Wash. Acad. Sci.* 21: 171-172.

.... The extirpation of one butterfly by another. *Sci. Monthly* 33: 173-174.

.... A new subspecies of *Poanes massasoit* Scudder. *Annals Carnegie Mus.* 21: 7-9, fig. 1.

1932. The butterflies of the District of Columbia and vicinity. *U. S. Nat. Mus. Bull.* 157, pp. i-ix, 1-337, pls. 1-64.

.... The forms of the common Old World Swallowtail Butterfly (*Papilio machaon*) in North America, with descriptions of two new subspecies. *Proc. U. S. Nat. Mus.* 81: 1-15, pls. 1-8.

1934. Observations on the butterflies of Apple Orchard Mountain, Bedford County, Virginia. *Proc. Biol. Soc. Wash.* 47: 177-180.

1935. Arctic butterflies. *Smiths. Inst. Ann. Rept. 1934*: 267-296, pls. 1-7.

.... The butterflies of Virginia. *Smiths. Inst. Explorations and Field-Work, 1934*: 33-36, figs. 28-31.

.... Another record of the occurrence of *Strymon ontario* in Missouri, with notes on the larva (Lepid.: Lycænidæ). *Ent. News* 46: 123,124.

1935. [*Hesperia metea* and *Thorybes confusis* from Difficult Run, Virginia.] *Proc. Ent. Soc. Wash.* 37: 169.

1936. Some butterflies from eastern Virginia. *Journ. Wash. Acad. Sci.* 26: 66-70, figs. 1-14 (LEILA F. CLARK, joint author).

.... Notes on the butterflies of the genus *Enodia* and description of a new fritillary from Peru. *Proc. U. S. Nat. Mus.* 83: 251-259, pl. 22.

.... Who's who among the butterflies. *Nat. Geogr. Mag.* 69: 679-692, pls. 1-8.

.... The Gold-Banded Skipper (*Rhabdoides cellus*). *Smiths. Misc. Coll.* 95 (7): 1-50, pls. 1-8.

.... The swallowtail butterflies. *Smiths. Inst. Ann. Rept. 1935*: 383-408, pls. 1-14.

1937. The butterflies of Virginia. *Smiths. Inst. Explorations and Field-Work 1936*: 47-52, figs. 40-45.

.... A new subspecies of the nymphalid butterfly, *Polygonia faunus*. *Proc. U. S. Nat. Mus.* 84: 219-222, pl. 10.

.... Records of *Argynnis diana* and some other butterflies from Virginia. *Journ. Wash. Acad. Sci.* 27: 209-213 (CARROLL M. WILLIAMS, joint author).

.... Preliminary list of the butterflies of Virginia. *Proc. Biol. Soc. Wash.* 50: 87-92 (LEILA F. CLARK, joint author).

.... The butterflies of Virginia. (Abstract of a paper read before the Entomological Society of Washington.) *Proc. Ent. Soc. Wash.* 39: 116.

.... Surveying the butterflies of Virginia. *Sci. Monthly* 45: 256-265.

1938. The butterflies of Virginia. *Smiths. Inst. Explorations and Field-Work 1937*: 77-80, figs. 80-82.

.... Butterflies from Virginia and the District of Columbia. *Proc. Ent. Soc. Wash.* 51: 1-6 (LEILA F. CLARK, joint author).

.... Notes on Virginia butterflies. *Proc. Biol. Soc. Wash.* 51: 177-182 (LEILA F. CLARK, joint author).

.... [Note on Holland's figure of *Danaus plexippus*; and note on the occurrence of *Calpodes ethlius* in Virginia in 1937] *Proc. Ent. Soc. Wash.* 40: 111.

1939. Butterflies of a wood road, Suffolk, Virginia. *Ent. News* 50: 1-5 (LEILA F. CLARK, joint author).

.... Butterflies from Virginia. *Proc. Biol. Soc. Wash.* 52: 172-184 (LEILA F. CLARK, joint author).

.... The butterflies of Virginia. *Smiths. Inst. Explorations and Field-Work, 1938*: 65-68, figs. 64-68.

1940. Butterflies of Virginia. *Smiths. Inst. Explorations and Field-Work, 1939*: 63-66, figs. 68-73.

1941. Butterflies of Farmville, Virginia. *Journ. Wash. Acad. Sci.* 31: 38-40 (FRANK W. TRAINER, joint author).

.... Some early butterfly records from Georgia. *Proc. Ent. Soc. Wash.* 43: 80-85 (LEILA F. CLARK, joint author).

.... The genus *Colias* in North America (Lepidoptera: Pieridæ). *Ent. News* 52: 185-187; 220-225.

.... Notes on some North and Middle American danaid butterflies. *Proc. U. S. Nat. Mus.* 90: 531-542, pls. 71-74.

.... Notes on the American representatives of the butterfly genus *Argynnis*. *Journ. Wash. Acad. Sci.* 31: 381-384.

.... Butterflies of Virginia. *Smiths. Inst. Explorations and Field-Work 1940*: 57-60, figs. 59-62.

1944. A new butterfly from the Solomon Islands. *Proc. Biol. Soc. Wash.* 57: 95-96.

.... Butterflies of the Southwest Pacific. 5pp., mimeographed.

1946. Two new butterflies from the Admiralty Islands. *Proc. Biol. Soc. Wash.* 59: 119-120.

1947. The interrelationships of the several groups within the butterfly superfamily Nymphaloidea. *Proc. Ent. Soc. Wash.* 49: 148-149.

1948. Surveying the butterflies of Virginia—from the human as well as the scientific viewpoint. (Author's abstract of his address as retiring president of the Entomological Society of Washington). *Proc. Ent. Soc. Wash.* 50: 74-76.

.... Classification of the butterflies, with the allocation of the genera occurring in North America north of Mexico. *Proc. Biol. Soc. Wash.* 61: 77-84.

.... A new subspecies of *Glaucopsyche lygdamus. Proc. Ent. Soc. Wash.* 50: 176-178.

1949. *Nymphalis io* from England in Washington, D.C. *Entomologist* 82: 72.

1950. Foreward to "The Butterflies of Georgia," by Lucien Harris, Jr. *Georgia Soc. of Naturalists, Bull.* no. 5: p. 1.

.... Butterfly flyways and playgrounds. *Lepid. News* 4: 13.

.... HÜBNER'S "Florida." *Lepid. News* 4: 62.

.... Lepidopterous larva feeding on exudations from woolly aphids. *Lepid. News* 4: 52.

1951. The butterflies of Virginia. *Smiths. Misc. Coll.* 116 (No. 7): vii+239 pp., frontispiece, pls. 1-30, fold map (LEILLA F. CLARK, joint author).

.... Butterflies of the Marshall Islands. *Proc. Ent. Soc. Wash.* 53: 43-44.

1951. The organization and the first annual meeting of the Lepidopterists' Society in New York. *Proc. Ent. Soc. Wash.* 53: 114.

.... *A Field Guide to the Butterflies of North America East of the Great Plains,* by Alexander B. Klots (review). *Sci. Monthly* 72: 408.

1952. The first record of a butterfly migration in America. *Lepid. News* 6: 42.

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HANS KAUTZ, the Austrian lepidopterist known especially for his outstanding work with *Pieris bryoniæ* and *P. napi,* died at the age of 85 at Seewalchen, Upper Austria, on 28 October 1954. According to an obituary notice by S. R. BOWDEN in *The Entomologist* (vol. 87: p. 272; 1954), KAUTZ was born in Vienna on 5 June 1870, took his diploma in mechanical engineering at Vienna, and served with the State Railways until his retirement in 1923. His principal publication, with L. MÜLLER as co-author, was a superb monograph on *P. napi* and *P. bryoniæ* published in 1939 (*Abh. Oesterr. Ent. Ver.,* vol. 1:191 pp.). KAUTZ by then had personally studied alive at least 50,000 of these complicated and controversial *Pieris* and had reared over 200 broods. His entire collection, notes, and library were destroyed in his house by a bomb in February 1945. Nevertheless, he continued publishing occasional papers after the war.

C. L. REMINGTON

REVIEWS

MOTYLI. 3. By Rudolf Schwarz. 157 pp., 48 col. pls. 1953. Publisher: Československé Akademie Véd, Prague, Czechoslovakia. [Obtainable from the publisher or perhaps better through personal arrangement with a fellow member of The Lepidoperists' Society living in Czechoslovakia.]

This is the third of Dr. SCHWARZ'S series of superbly illustrated little volumes on the Lepidoptera of Czechoslovakia (see review of volumes 1 and 2 in *Lepid. News* 5: 62; 1951). Volume 3 covers the Sphingidæ, Ægeriidæ, Cossidæ, Orneodidæ, and Pterophoridæ. Not only are the adults figured, but also the larvæ and pupæ of most Sphingidæ and many of the others, all in excellent color. The text is in Czech, but the Latin names of foodplants and parasites are easy to recognize.

ATLAS MOTYLŮ. By Julius Komárek & Jaroslav Tykač. 115 pp., 48 col. pls. 1952. Publisher: Melantrich, Prague, Czechoslovakia.

This is another small and beautifully illustrated book on Czechoslovakian Lepidoptera. Most families (including "Micros") are shown, but the emphasis is strongly on the "Macro" moths and the butterflies. A fair number of larvæ are figured. The color reproduction is very fine. This being an *Atlas,* there is little text, but the months of flight and localities are given in the plate captions.

THE BUTTERFLIES AND SKIPPERS OF LOUISIANA. By Edward Nelson Lambremont. *Tulane Studies in Zoology,* vol. 1: pp. 127-164, 3 figs., 3 tables. 30 April 1954. Publisher: Dept. of Zoology, Tulane University, New Orleans 18, La., U. S. A. [Obtainable from the publisher for $0.60.]

This is an annotated check list of the 98 species and subspecies known to the author from Louisiana; 38 are new State records. Parish records and flight dates are given, but few if any original foodplant notes. Undoubtedly a request for records from Lepidopterists' Society members would have greatly extended this list and its substance. The reviewer, in fact, collected additional species in Louisiana several years ago and reared some.

A LIST OF NORTH AMERICAN LEPIDOPTERA IN THE LOS ANGELES COUNTY MUSEUM. PART I BUTTERFLIES (SUBORDER RHOPALOCERA). By Lloyd M. Martin & Fred S. Truxal. Los Angeles Co. Mus. Sci. Series No. 18, Zoology No. 8: 34 pp. Sept. 1955. [Price $1.10 postpaid, unbound; available from Los Angeles County Museum, Exposition Park, Los Angeles 7, Calif., U. S. A.]

This list shows the exact number of specimens of every species, subspecies, and form of North American butterfly contained in this most outstanding museum collection on the Pacific Coast. Type specimens are tabulated. Of considerable use to butterfly collectors anywhere in the continent is the citation, for each entity, of the state or province and the months of capture of specimens in the collection. The nomenclature follows closely that of the 1938 McDUNNOUGH *Check List,* and it is disappointing to see in such a potentially useful list as this new one that the many obvious and generally accepted revisions of nomenclature are not used. As exceptions, *Agraulis, Speyeria,* and *Boloria* are noted instead of *Dione, Argynnis,* and *Brenthis.* Ignored are: R. CHERMOCK'S sinking of *Enodia* and *Satyrodes* under *Lethe;* the use of *selene* and *toddi* for our two commonest and most widespread *Boloria*; the use of *Libytheana* for our species of Snout Butterflies; the flat homonymy of *Heterochroa* and *Pieris napi pseudonapi;* the NABOKOV and CLENCH revisions among the Blues; and many others. Some of the taxonomic placements are surprising, such as the listing of *S. caryævorus* as a race of *Strymon liparops.* A serious mistake is the use in print of a manuscript name, "*Megathymus yuccæ martini*", although this name has not yet been published and validated by its real authors; fortunately, this appears to be a *nomen nudum* and can be ignored if "S. Calif.; Jan.-Apr." does not constitute a validation in the sense of the *Règles.* These points show that as a check list for up-to-date nomenclature, this otherwise useful publication has little value.

CHECK LIST OF THE LEPIDOPTERA OF JAPAN. PART 1: MICROPTERIGIDÆ—PHALONIDÆ. By Hiroshi Inoue. 112 pp. 15 Oct. 1954. Publisher: Rikusuisha Co., 112/4 Iriarai, Otaku, Tokyo, Japan. [Obtainable from the publisher, unbound, for $2.00 postpaid.]

The author intends to issue this long-needed new check list in parts, at frequent intervals. The MCDUNNOUGH *Check List* (North American) arrangement is used for families, but, as one would prefer, the sequence is reversed so that "primitive" families precede more specialized ones. This first part therefore deals with the Homoneura and the first 29 Japanese families of the Heteroneura (*i. e.,* the so-called "true Micros"); there are 635 Japanese species listed. Part 1 begins with a list, arranged by superfamilies, of the 67 families which the author accepts for Japanese Lepidoptera.

For each species Mr. INOUE gives the reference to the original description and to that of each synonym. He also lists the known distribution, in some cases the precise locality if no other is known.

Part 2 will deal with the superfamilies Pyralidoidea, Zygænoidea, and Uranioidea; Part 3 with the Geometridæ; Part 4 with the Drepanoidea, Bombycoidea, Lymantriidæ, and Notodontidæ; Part 5 with the Noctuidæ; Part 6 with the Agaristidæ, Arctiidæ, Nolidæ, Amatidæ, Saturnioidea, and Sphingidæ; and Part 7 (by T. SHIRÔZU) with the butterflies.

SUOMEN SUURPERHOSTOUKIEN RAVINTOKASVIT [The foodplants of the Macrolepidoptera larvæ of Finland]. By Eino J. Seppänen. 416 pp. 1954. Publisher: Werner Söderström Osakeyhtiö, Parvoo, Finland. [Obtainable from the publisher for $4.67 unbound, $5.57 bound.]

This is an extremely valuable book for lepidopterists anywhere interested in extensive rearing. Already, the Yale group has had several occasions to look in it for the known foodplants of Finnish relatives in order to get ideas for possible foods of American species whose host plants were unknown to us. It makes an excellent companion volume for P. B. M. ALLAN'S fine handbook of foodplants of British Macrolepidoptera (see *Lepid. News* 5: p. 60; 1951). SEPPÄNEN lists for each species (where known): one or more published figure of the larva; the foodplants known in Finland; larval habits; dates of larval stages; Swedish foodplants, and Central European foodplants. The second part of the book is a list of the plants and under each the Lepidoptera feeding on them. Finally, there are complete indices of the names of Lepidoptera and of plants, followed by a list of references.

FAUNULA LEPIDOPTEROLOGICA ALMERIENSE. By Ramón Agenjo. 370 pp., 35 figs., 24 pls. (5 col.). Publisher: Consejo Superior de Investigaciones Cientificas, Madrid, Spain. [Obtainable from the publisher.]

This is a taxonomic study of the 330 species of Lepidoptera (in 29 families) now known from Almería province on the southern coast of Spain. For many of the most interesting species there are maps of their Spanish distribution. Described as new are 1 subfamily (Rhodometrinæ of Geometridæ), 7 genera, 2 subgenera, and 7 species. All new species and some other rarities are figured in color. There are many figures of male and female genitalia and several habitat photographs. *Papilio machaon marbelliensis* Bryk is synonymized under *P. m. hispanicus* Eller.

THE TYPE MATERIAL IN THE J.B. SMITH AND G.D. HULST COLLECTIONS OF LEPIDOPTERA IN THE AMERICAN MUSEUM OF NATURAL HISTORY. By Frederick H. Rindge. *Bull. Amer. Mus. Nat. Hist.,* vol. 106: pp. 91-172. 25 April 1955. Publisher: the above Museum, New York 24, N. Y., U. S. A. [Obtainable from the publisher for $1.00.]

For traditional taxonomy, the largest single acquisition of types (over 2200, with about 1200 holotypes) in recent years by any American museum came with the recent transfer from Rutgers University to the American Museum of Natural History of the SMITH and HULST collections. Dr. RINDGE has now catalogued all this material and incorporated it into the general collection of the Museum. In the present publication all of the type specimens are listed, with their complete data. Lectotypes are not usually designated, but it is presumed that SMITH'S term "type male" meant holotype, and "type female" meant allotype. For convenience, the species are listed alphabetically by specific name within each family. (SMITH'S types are principally Noctuidæ, HULST'S mainly Geometridæ). This is a painstaking paper which will be essential to taxonomists working with North American Noctuidæ and Geometridæ.

C. L. REMINGTON

THE EVANS CATALOGUE OF AMERICAN SKIPPERS

The most comprehensive and important publication in recent years on American Skippers is *A Catalogue of the American Hesperiidæ* indicating the classification and nomenclature adopted in the British Museum (Natural History), by Brigadier W. H. EVANS. The author is without question the leading authority on the Hesperiidæ of the world and is well known for his volumes on identification of Indian butterflies, as well as for his catalogues of the African and of the Palearctic and Indo-australian Hesperiidæ. The new catalogue completes his treatment of all the known genera, species, and subspecies of Skippers in the world.

Part I (92 pp., 9 plates) covers the Pyrrhopyginæ, Parts II (178 pp., 16 plates) and III (246 pp., 28 plates) the Pyrginæ, and Part IV (499 pp., 35 plates) the Hesperiinæ and Megathyminæ. As in the other EVANS "catalogues", this is actually a huge identification key, with a list of localities of British Museum specimens, and does not give reference citations as is usual in taxonomic catalogues. The year of publication is always given, so that original descriptions can usually be found in the Zoological Record. The plates are composed of hundreds of line drawings of genitalia. Many new genera, species, and subspecies are described, especially from South America.

We hope to present in the *News* a full analytical review by a Skipper specialist of this great work. Meanwhile *News* readers should be aware of its existence. It may be purchased from: The British Museum (Nat. Hist.), Cromwell Road, London S. W. 7, England; and from E. W. CLASSEY, 91 Bedfont Lane, Feltham, Middx., England.

C. L. REMINGTON

RECENT LITERATURE ON LEPIDOPTERA

(Under the supervision of PETER F. BELLINGER)

Under this heading are included abstracts of papers and books of interest to lepidopterists. The world's literature is searched systematically, and it is intended that every work on Lepidoptera published after 1946 will be noticed here; omissions of papers more than 3 or 4 years old should be called to Dr. BELLINGER'S attention. New genera and higher categories are shown in CAPITALS, with types in parentheses; new species and subspecies are noted, with type localities if given in print. Larval foodplants are usually listed. Critical comments by abstractors may be made. Papers of only local interest and papers from *The Lepidopterists' News* are listed without abstract. Readers, particularly outside of North America, interested in assisting with this very large task, are invited to write Dr. BELLINGER (University College of the West Indies, Mona, St. Andrew, Jamaica, B.W.I.). Abstractors' initials are as follows: [P.B.] — P. F. BELLINGER; [I.C.] — I. F. B. COMMON; [A.D.] — A. DIAKONOFF; [W.H.] — W. HACKMAN; [J.M.] — J. MOUCHA; [E.M.] — E. G. MUNROE; [N.O.] — N. S. OBRAZTSOV; [C.R.] — C. L. REMINGTON; [J.T.] — J. W. TILDEN; [P.V.] — P. E. L. VIETTE.

D. VARIATION AND GENETICS

Sicher, Harry, "A mutant of *Strymon titus titus.*" *Lepid. News,* vol. 6: p. 107. 19 Feb. 1953.

Vazquez G., Leonila, "Observaciones sobre pieridos mexicanos, con descripciones de algunas formas nuevas" [in Spanish]. *Ann. Inst. Biol. Mexico,* vol. 19: pp. 469-484, 4 figs. 1948. Notes on variation in 8 spp. Names a number of "forms". [P.B.]

Warnecke, G., "Neuzeitliche Formen unter den Lepidopteren der Nordseeküsten" [in German]. *Trans. 9th Int. Congr. Ent.,* vol. 1: pp. 569-574, figs. March 1953. Discusses forming of pale colored beach forms of certain Macrolepidoptera in the North Sea region, apparently quite recently, viz. in the postglacial period. Criticizes B. P. BEIRNE'S conclusions on the origin of similar forms in England. [A.D.]

Wohlfahrt, Th. A., "Untersuchungen über die zeitliche Variabilität des Segelfalters (*Iphiclides podalirius* L., Lep.)" [in German]. *Trans. 9th Int. Congr. Ent.,* vol. 1: pp. 165-168, 1 fig., tables. March 1953. Abbreviation of the paper read at the special meeting of The Lepidopterists' Society; cf. *Lepid. News,* vol. 6: pp. 13-27.

E. DISTRIBUTION AND PHENOLOGY

Baeta-Neves, C. M., "Nota sobre a entomofauna dos produtos armazenados na ilha da Madeira" [in Portuguese]. *Portug. Acta Biol. (B),* vol.4: pp.346-350. 2 Oct. 1954. *Ephestia kühniella,* in cured tobacco, new to Madeira. [P.B.]

Bauer, Heinrich, "*Larentia clavaria* Haw. (*Ortholotha cervinata* Schiff.) in Nordbayern (Lep. Geom.)" [in German]. *Nachrbl. Bayer. Ent.,* vol.3: pp.74-77. 15 Aug. 1954. Discusses records in Bavaria and biology. [N.O.]

Berger, L. A., "Contribution à l'étude des Pieridæ du Liberia" [in French]. *Bull. Inst. franç. Afr. Noire,* vol.16: pp.1031-1034. Oct. 1954. List of 19 Pieridæ collected in Liberia, with addition of 2 spp. of Lycænidæ. [P.V.]

Bernardi, G., "Lépidoptères Pierides" *in* "La reserve naturelle intégrale du Nimba" [in French]. *Mém.Inst. franç. Afr. Noire,* no.40: pp.355-358. 19 Nov. 1954. List of species collected in the Nimba Mts. (French Guinea). [P.V.]

Blais, J. R., *et al.,* "Effects of weather on the forest tent caterpillar *Malacosoma disstria* Hbn., in central Canada in the spring of 1953." *Canad. Ent.,* vol.87: pp.1-8, 3 figs. 28 Jan. 1955. Epidemic populations in Ontario and eastern Manitoba were drastically reduced by unfavorable spring weather. In Ontario larvæ were killed by a period of freezing weather following early favorable temperatures. In Manitoba prolonged cool wet weather after hatching was the main lethal factor. The parasite *Sarcophaga aldrichii* was not affected by the weather and caused further reduction of the residual population. [E.M.]

Bradley, J.D., "New British moths." *Country Life,* vol.116: p.1778, 2 figs. 18 Nov. 1954. *Hydræcia hucherardi, Adoxophyes orana, Tinea columbariella,* new to Britain. [P.B.]

Chapman, John A., "Observations on snow insects in western Montana." *Canad. Ent.,* vol.86: pp.357-363, 1 fig. 7 Sept. 1954. Females of *Operophtera* sp. (near *or* = *occidentalis)* on fresh snow in October. [E.M.]

Daniel, F., "Effects de la période glaciaire sur le cycle évolutif de nos Lépidoptères et considérations générales à propos de la multiplicité des générations annuelles" [in French]. *Bull. Soc. Ent. Mulhouse, 1954*: pp.25-29. April 1954. Effects of the glacial period on the evolutive cycle of Lepidoptera and general considerations about the multiplicity of the yearly emergences. [P.V.]

Dufay, C., "Une géometride nouvelle pour la faune française: *Boarmia viertlii* Boh." [in French]. *Bull. Soc. Linn. Lyon,* vol.23: pp.227-228. Nov. 1954. *B. viertlii,* described from Hungary, new to France; notes on *Eupithecia cooptata* and *E. spissilineata.* [P.V.]

Eisenberger, F., "Bildet *Isturgia roraria* F. in Südbayern eine 2. Generation oder handelt es sich um 2 Stämme?" [in German]. *Nachrbl. Bayer. Ent.,* vol.3: pp.65-66. 15 July 1954. Presumes 2 independent cycles, not 2 generations. [N.O.]

Esch, Walter, "Bez. 'Kleine Mitteilungen' aus Heft Nr. 7, 2.Jhrg., und Nr. 1, 3.Jhrg." [in German]. *Nachrbl. Bayer. Ent.,* vol.3: p.96. 15 Sept. 1954. Records of *Lymantria monacha* ab. "eremita" and ab. "nigra" in S. Bavaria. [N.O.]

Evans, W. H., "Lépidoptères hespériides" *in* "La réserve naturelle intégrale du Mont Nimba" [in French]. *Mém. Inst. franç. Afr. Noire,* no.40: pp.343-346. 19 Nov. 1954. Study of a collection of Hesperiidæ made in the Nimba Mts. (French Guinea). [P.V.]

Foltin, Hans, "Beitrag zur Fauna von Oberösterreich. Abschliessender Beitrag zur Fauna des Mühlviertels" [in German]. *Zeits. Wiener Ent. Ges.,* vol.38: pp.154-160. 15 June 1953. New records. [N.O.]

Freund, A., "Vertikalverbreitung von *Pionea lutealis* Hb. (Pyralidæ, Microlepidopt.)" [in German]. *Nachrbl. Bayer. Ent.,* vol.3: pp.22-23, 31-32. 15 Feb., 15 March 1954. Discusses biology and vertical distribution in Bavaria and Austria. [N.O.]

Galvagni, Egon, "Schmetterlinge aus dem westlichen Alpengebiet Niederösterreichs: aus Waidhofen an der Ybbs, Ybbsitz, Lunz und dem Ybbstal, dem Minichholz bei Steyr (N.-Ö.) und Umgebung; aus Türnitz, dem Ötschergebiet, Annaberg und der Walster (Prodromus Zone 1 und 4). Nachträge, Ergänzungen und Erweiterungen zu Dr. med. Carl Schawerdas Lepidopterenfauna des südwestlichen Winkels von Niederösterreich 1913 und 1915 und Franz Saurucks Nachträgen dazu 1927 und 1928" [in German]. *Zeits. Wiener Ent. Ges.,* vol.38: pp.201-206. 15 Aug. 1953. Records, species, and localities new for the area. [N.O.]

Hayek, Walter, "Erstmaliger Nachweis der *Zygæna læta* Hb. im Föhrenwald bei Wiener Neustadt" [in German]. *Zeits. Wiener Ent. Ges.,* vol.38: p.333. 15 Dec. 1953. First record since 1930. [N.O.]

Herbulot, C., "Confirmation de l'existence de *Sterrha fathmaria* en France" [in French]. *Entomologiste,* vol.10: p.91. Nov. 1954. New localities in France of *S. fathmaria,* described from North Africa. [P.V.]

Kusdas, Karl, "Ein Beitrag zur Schmetterlingsfauna des Ennsdorfer Gebietes in Niederösterreich" [in German]. *Zeits. Wiener Ent. Ges.,* vol.38: pp.75-77, 103-106, 128-130, 145-147. 1 April, 30 April, 15 May, 15 June 953. Annotated list.

Löberbauer, Rudolf, "Gedanken zur geplanten Neuherausgabe der Lepidopteren-Fauna von Oberösterreich" [in German]. *Zeits. Wiener Ent. Ges.,* vol.38: pp.185-191. 15 July 1953. Discusses the recent status of the Lepidoptera studies in Upper Austria and makes proposals for future work. [N.O.]

Tsesche, Rudolf, & Friedhelm Korte, "Uber Pteridine. IX. Mitteil.: Zur Kenntnis des sogen. fluorescyannins" [in German]. *Chem. Berichte,* vol. 87: pp.1713-1719. 1954.

MacNay, C. G., "New records of insects in Canada in 1952: a review." *Canad. Ent.,* vol.86: pp.55-60. 10 March 1954. Notes as new to North America: *Cacœcia oporana* (L.) (Tortricidæ, Europe), Vancouver, B.C.; *Monopis ferruginella* Hbn. (Europe), Vancouver; *Cnephasia virgaureana* Tr. (Tortricidæ, Europe), St. Johns, Nfld. *Aphomia gularis* was found infesting a warehouse at Vancouver, the only previous Canadian record having been from Montreal in 1934. *Phlegethontius quinquemaculatus* was found for the first time in Sask., and *Rhyacionia buoliana* in P. E. I. and Nfld. [E.M.]

Mathewman, W. G., D. G. Harcourt, & J. P. Perron, "Timing of DDT applications for control of caterpillars on cabbage." *Canad. Ent.,* vol.84: pp.346-352. 28 Nov. 1952. Gives incidental notes on seasonal cycles of 3 spp. In 1950, *Pieris rapæ* declined sharply in numbers early in August. This happens in many years as the result of natural control. *Plutella maculipennis* increased sharply at about the same time, while *Trichoplusia ni* remained at consistently low numbers. [E.M.]

Menhofer, Herbert, "Interessante Falterfunde in Nordbayern" [in German]. *Nachrbl. Bayer. Ent.*, vol.3: pp.102-103, 108-110, 119-125. 15 Oct., 15 Nov., 15 Dec. 1954. New records in N. Bavaria; annotated list. [N.O.]

Pfister, Hermann, "Beobachtungen an den Scoparien der bayerischen Fauna (Lepid., Pyralid.)" [in German]. *Nachrbl. Bayer. Ent.*, vol.3: pp.117-119. 15 Dec. 1954. Discusses the most interesting of the Bavarian *Scoparia* species and new records. [N.O.]

Pröse, Herbert, "Thüringische Faunenelemente im bayrischen Vogtland" [in German]. *Nachrbl. Bayer. Ent.*, vol.3: pp.79-80, 86-89. 15 Aug., 15 Sept. 1954. Discusses zoogeographical problems. [N.O.]

Reiss, Hugo, "Über drei Zygænen, die als regressive Endemiten bezeichnet werden können, deren Entstehung vermutlich in der Pliozänzeit erfolgte" [in German]. *Zeits. Wiener Ent. Ges.*, vol.38: pp.131-141, 3 figs., 3 pls. 15 May 1953. Discusses the geological age of *Zygæna elegans* Bgff., *Z. giesekingiana* Reiss, and *Z. vesubiana* Le Charles, on the basis of their recent distribution. Figures various species of the genus, their subspecies, and other forms. [N.O.]

Reisser, Hans, "Weitere Notizen zur Lepidopterenfauna Niederösterreichs" [in German]. *Zeits. Wiener Ent. Ges.*, vol.38: pp.247-250. 15 Sept. 1953. New localities. [N.O.]

Ronniger, Hermann, "Ein neuer Fund von *Grammodes stolida* F. in Nieder-Österreich" [in German]. *Zeits. Wiener Ent. Ges.*, vol.38: p.321. 15 Dec. 1953. New record near Vienna. [N.O.]

Rougeot, P. C., "Lépidoptères saturniides" *in* "La réserve naturelle intégrale du Mont Nimba." [in French]. *Mém. Inst. Franç. Afr. Noire*, no.40: pp.339-341. 19 Nov. 1954. List of a collection of Saturniidæ from the Nimba Mts. (French Guinea). [P.V.]

Schütze, Edward, "Eupithecien-Studien V. (Lep. Geom.). Kurze faunistische Mitteilungen" [in German]. *Nachrbl. Bayer. Ent.*, vol.3: pp.114-117. 15 Dec. 1954. New records, distributional and biological notes on 7 European spp. [N.O.]

Schwingenschuss, Leo, "Beitrag zur Lepidopterenfauna von Niederösterreich: St. Peter i. d. Au, Seitenstetten und Umgebung" [in German]. *Zeits. Wiener Ent. Ges.*, vol.38: pp.37-39, 77-78, 101-103, 142-144, 170-176, 196-198, 217-223, 251-255, 282-287, 309-311. 1 March, 1 April, 30 April, 15 May, 15 June, 15 July, 15 Aug., 15 Sept., 15 Oct., 15 Nov. 1953. Annotated list of 599 Macrolepidoptera and 64 Microlepidoptera. Names some aberrations. [N.O.]

Stempffer, H., "Lépidoptères Lycænides (2ᵉᵐᵉ note)" *in* "La réserve naturelle intégrale du Mont Nimba" [in French]. *Mém. Inst. franç. Afr. Noire*, no.40: pp.347-354. 19 Nov. 1954. Second note on the Lycænidæ collected in the Nimba Mts. (French Guinea). [P.V.]

Urbahn, Ernst, "1953, ein Jahr überzählinger Faltergenerationen" [in German]. *Nachrbl. Bayer. Ent.*, vol.3: pp.27-31, 36-38, 45-47. 15 March, 15 April, 15 May 1954. Discusses the cause of odd generations in several species in Germany in 1953. [N.O.]

Wagner, Hans, "*Harmodia tephroleuca* Bsd. und *Rhyacia castanea* f. *cerasina* Frr. in den bayerischen Voralpen" [in German]. *Nachrbl. Bayer. Ent.*, vol.3: pp.41-45. 15 May 1954. Discusses occurrence of the above and some other species in the Alps. [N.O.]

F. BIOLOGY AND IMMATURE STAGES

Abdel-Malek, Albert, & Edward A. Steinhaus, "Invasion route of *Nosema* sp. in the Potato Tuberworm, as determined by ligaturing." *Journ. Parasitol.*, vol. 34: pp. 452-453. 16 Nov. 1948. Microsporidian penetrates wall of gut of *Gnorimoschema*. [P. B.]

Acatay, Abdulgafur, "Ein Zederschädling: *Acalla undulana* Wlsgm." [in German]. *Trans. 9th Int. Congr. Ent.*, vol. 1: pp. 708-710, 6 figs. March 1953. Gives life-history and describes injury to *Cedrus* in South Anatolia (Asia Minor). [A. D.].

Alayo, Pastor, "Notas sobre la *Colobura dirce* (Linn.) (Lepidoptera-Nymphalidæ)" [in Spanish]. *Bol. Hist. Nat. Soc. Cubana Hist. Nat. "Felipe Poey"*, vol. 1: p. 97. Sept. 1950. Life history notes; foodplant *Cecropia*. [P. B.]

Alexseiev, V. A., & V. E. Murav'ev, "An experiment in rearing the Chinese Oak Silkworm (*Antheræa pernyi* Guér.-Men.) on leaves of certain varieties of willows" [in Russian]. *Dokl. Vses. Akad. Sel'sk. Nauk im. Lenina*, vol. 13, no. 11: pp. 37-41, 2 figs. 1948. [Not seen.]

Alibert, Henri, "Les insectes vivant sur les cacaoyers en Afrique occidentale" [in French]. *Mém. Inst. franç. Afr. Noire*, no. 15: 174 pp., 7 pls., 210 figs. 15 Nov. 1951. Detailed descriptions of all spp. known to attack coffee plants, including 40 Lepidoptera. Discusses biology; figures some adults and early stages. [P. B.]

Allen, Robert P., "Occurrence of Ugly-nest Caterpillar in California." *Bull. Calif. Dept. Agric.,* vol. 62: pp. 165-170, figs. 1953. Photos of adults, egg masses, larvæ, pupæ and nests; drawings of ♂ and ♀ genitalia; *Archips cerasivorana* (Tortricidæ). [J. T.]

Ananthanarayanan, K. R., "A short note on the *Eugenia* leaf caterpillar *Carea subtilis* Wlk." *Journ. Bombay Nat. Hist. Soc.,* vol. 50: pp. 418-421, fig. Dec. 1951. Describes early stages. [P. B.]

Angus, T. A., "A bacterial toxin paralyzing silkworm larvæ." *Nature,* vol. 173: pp. 545-546. 20 March 1954.

Anonymous, "Insect pests of maize." *Agric. Gaz. N. S. Wales,* vol. 60: pp. 258-262, 5 figs. 1 May 1949. Brief notes on *Cirphis unipuncta, Heliothis armigera, Dichocrocis punctiferalis, Batrachedra rileyi, Sitotroga cerealella,* and their control. [P. B.]

Anonymous, "The Orange-barred Grass Moth (*Eutane terminalis*)." *Agric. Gaz. N. S. Wales,* vol. 61: pp. 89-90, 3 figs. 1 Feb. 1950. Reprinted in vol. 63: p. 98; Feb. 1953. Life history (Arctiidæ).

Anonymous, "Introduccion de insectos beneficiosos para combatir una plaga grave de la caña de azucar en Venezuela" [in Spanish]. *Agr. Venezolana,* no. 146: pp. 40-42, 4 figs. Sept. 1950. Describes damage done by *Diatræe* larvæ and discusses biological control [P. B.]

Anonymous, "The Peach Tip Moth (*Cydia molesta*)." *Agric. Gaz. N. S. Wales,* vol. 62: pp. 422-423, 2 figs. 1 Aug. 1951. Biology and control.

Anonymous, "The Common Grain Moth (*Sitotroga cerealella*)." *Agric. Gaz. N. S. Wales,* vol. 62: pp. 473-475, 3 figs. 1 Sept. 1951. Biology and control.

Anonymous, "The Bag-shelter Moth (*Ochrogaster contraria*)." *Agric. Gaz. N. S. Wales,* vol. 62: pp. 597-599, 6 figs. 1 Nov. 1951. Biology and control; on *Acacia pendula.* [P. B.]

Anonymous, "The Potato Moth (*Gnorimoschema operculella*)." *Agric. Gaz. N. S. Wales,* vol. 62: pp. 664-667, 3 figs. 1 Dec. 1951. Biology and control.

Anonymous, "Codling Moth (*Cydia pomonella*)." *Agric. Gaz. N. S. Wales,* vol. 63: pp. 422-425, 430, 4 figs. 1 Aug. 1952. Biology and control.

Anonymous, "The *Heliothis* caterpillar (*Heliothis armigera*). The Grape-vine Moth (*Phalænoides glycine*). A tussock moth (*Orgyia anartoides*)." *Agric. Gaz. N. S. Wales,* vol. 63: pp. 662-669, 9 figs. Dec. 1952. Biology and control.

Anonymous, "Insect pests of the Kurrajong." *Agric. Gaz. N. S. Wales,* vol. 64: pp. 95-97, 6 figs. Feb. 1953. Biology of *Sylepta clytusalis* on this tree. [P. B.]

Anonymous, "A false-looper." *Agric. Gaz. N. S. Wales,* vol. 64: pp. 147-148, 1 fig. March 1953. *Plusia chalcites,* biology and control.

Anonymous, "La mosca amazonica en Venezuela" [in Spanish]. *Agricultor Venezol.,* vol. 17, no. 160: pp. 4-5, 10 figs. March 1953. Report on successful introduction of dipterous parasites of *Diatræa.* Figures larvæ of latter and adults of 5 spp., and larvæ and adults of 2 spp. of parasites. [P. B.]

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Anonymous, "Los taladradores de la caña de azucar y su control biológico" [in Spanish]. *Agricultor Venezolano,* vol. 19, no. 172; pp. 34-37, 6 figs. Oct. 1954. Biological control of Diatræa spp. in Venezuela. [P. B.]

Atkins, E. Lawrence, "Fruit Tree Leaf Roller on citrus." *Calif. Citrograph,* vol. 36: pp. 246, 254. April 1951. *Archips argyrospila;* Biology and control

Atkins, E. Lawrence, "Biology and control of Orangeworms." *Calif. Citrograph,* vol. 36: pp. 270, 288-291. May 1951. *Argyrotænia citrana, Pyroderces rileyi, Holcocera iceryæella, Platynota stultana.*

Averkiev, I. S., "Experiments in breeding of *Antheræa pernyi* in Mariiskaia ASSR" [in Russian]. *Priroda,* vol. 36, no. 3: pp. 65-67. 1947. [Not seen.]

Averkiev, I. S., "Lengthening of the hibernation period of cocoons of the Tussah Moth (*Antheræa pernyi* Guer.) and its significance to northern sericulture" [in Russian]. *Zool. Zhurn.,* vol. 33: pp. 644-647. May-June 1954. [Not seen].

Avidov, Z., "Biological and ecological studies on the Codling Moth (*Carpocapsa pomonella* L.) in Israel" [in Hebrew, English summary pp. 43-51]. *Ktavim,* vol. 2/3: pp. 155-189, 3 figs. Dec. 1952.

Baker, H. G., "Biological flora of the British Isles. *Melandrium* (Roehling *em.*) Fries. (*Lychnis* L. (1753) *partim.*)." *Journ. Ecol.,* vol. 35: pp. 271-292, 5 figs. Dec. 1947. Larval foodplant of *Eupithecia venosata, Hydriomena affinitata, H. decolorata, Harmodia capsincola, H. cucubali, H. nana, Phthorimæa viscariella.* Records also spp. visiting flowers. [P. B.]

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Bauer, David L., "Butterflies at water holes in central Arizona." *Lepid. News*, vol. 7: pp. 146-147. 12 Feb. 1954.

Beall, Geoffrey, & Richard R. Rescia, "A generalization of Neyman's contagious distributions." *Biometrics*, vol. 9: pp. 354-386, 2 figs. Sept. 1953. Mathematical development of a family of frequency distributions applicable to the occurrence of animals in nature, where the presence of one animal increases the likelihood of others being present; applied to occurrence of *Pyrausta nubilalis.* [P. B.]

Beaufoy, S., & E. M., "Britain's rarest native butterfly?" *Country Life*, vol. 117: p. 1242, 6 figs. 12 May 1955. Biology of *Strymonidia pruni.* [P. B.]

Beck, Edwin G., "The histology and biology of the *Solidago* gall caused by the larva of *Gnorimoschema gallæsolidaginis.*" *Amer. Journ. Bot.*, vol. 36: p. 794. Dec. 1949. Abstract only.

Beebe, William, "Two little-known selective insect attractants." *Zoologica, N. Y.*, vol. 40: pp. 27-32, 4 pls. 14 May 1955. Reports strong attraction of Danaidæ, Ithomiidæ, Euchromiidæ, & Arctiidæ (but no other families) to dried wild heliotrope plants; also attraction of Nymphalidæ, Morphidæ, and Brassolidæ to lesions in tangerine trees caused by disease. Species listed; some photographs of feeding insects. [P. B.]

Bengry, R. P., "Some observations on the noctuid moth *Xanthophastis timais* Cramer." *Nat. Hist. Notes Nat. Hist. Soc. Jamaica*, no. 46: p. 208, figs. Jan. 1951. Life history; food plant *Hymenocallis caribæa.* [P. B.]

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Bergamin, J., "A broca da cana de açùcar" [in Portuguese, English summary]. *Brasil Açucareiro*, vol. 32: pp. 493-498, 595-612, 18 figs. Nov., Dec. 1948. Biology of *Diatræa saccharalis;* figures all stages and 4 parasites. [P. B.]

Berger, L. A., "Note sur les moeurs d'*Augiades venata* Bremer-Grey" [in French.] *Lambillionea*, vol. 52: pp. 73-75. "1952" [1953]. Note on the rejection of a liquid by the anus and its absorbtion by the proboscis in the Hesperiidæ. [P. V.]

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Biliotti, E., P. Grison, & R. Silvestre de Sacy, "Observations sur le cycle évolutif de la Processionaire du Pin, *Thaumatopœa pityocampa* Schiff. (Lep. Notodontidæ)" [in French]. *Bull. Soc. Ent. France,* vol. 58: pp. 30-32. 1953. Notes on the life-history of *T. pityocampa* in different parts of France. [P. V.]

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Blok, I. B., "Disinfection of the seed of the Oak Silkworm with ultraviolet light" [in Russian]. *Visnyk Akad. Nauk URSR,* vol. 23: pp. 53-55. 1951. [Not seen.]

Blunck, H., "Über die bei *Pieris brassicæ* L., ihren Parasieten und Hyperparasieten schmarotzenden Microsporidien" [in German]. *Trans. 9th Int. Congr. Ent.,* vol. 1: pp. 432-438, 2 figs. March, 1953.

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Bouček, Z., & J. Šedivý, "Die Hymenopteren-Parasiten von *Hyphantria cunea* Drury in der Tchechoslowakei" [in Czech, Russian & German summaries]. *Folia Zool. Ent.,* vol. 3: pp. 169-189, 10 figs. Sept. 1954. Records hymenopterous parasites of eggs & nymphs of *H. cunea* from Czechoslovakia. [J. M.]

Bourquin, Fernando, "Cuatro notas sobre metamorfosis de microlepidopteros. I. *Aristotelia perplexa* Clarke. II. *Parastega hemisigna* Clarke. III. *Porphyrosela* sp. IV. *Darlia prætexta* Clarke" [in Spanish, French summaries]. *Acta. Zool. Lilloana,* vol. 12: pp. 509-518, 4 pls. "1951" [15 Oct. 1952]. Describes and figures all stages available, and describes habits. Food plants: *A. perplexa* (*Mimosa Bonplandii*); *P. hemisigna* (*Ligustrum*); *D. prætexta* (*Polygonum pessicaroides*). Records parasites of *Porphyrosela* sp. and *D. prætexta.* [P. B.]

Bourquin, Fernando, "Notas sobre la metamorfosis de *Antispastis clarki* Pastrana 1951 [i.e. 1952] (Lep. Glyphipterygidæ)" [in Spanish, French summary]. *Acta Zool. Lilloana,* vol. 12: pp. 523-526, 1 pl., 1 fig. "1951" [15 Oct. 1952]. Describes early stages and habits; foodplant *Solanum bonariense.* [P.B.]

Bourquin, Fernando, "Metamorfosis de *Amastus prosenii* Köhler 1949 (Lep. fam. Arctiidæ)" [in Spanish, French summary]. *Acta Zool. Lilloana,* vol. 12: pp. 527-532, 1 pl. "1951" [15 Oct. 1952]. Describes early stages and habits; figures larva, pupa, and adults. Foodplants *Rumex pulcher, Lactuca sativa.* [P.B.]

Bourquin, Fernando, "Metamorfosis de *Megalopyge lanceolata* Dogn. 1923 (Lep. Megalopygidæ)" [in Spanish, French summary]. *Acta. Zool. Lilloana,* vol. 12: pp. 533-538, 1 pl., 1 fig. "1951" [15 Oct. 1952]. Describes and figures all stages; foodplants: roses and Leguminosæ. [P. B.]

Box, Harold E., "Investigaciones sobre los taladradores de la caña de azucar (*Diatræa* spp.) en Venezuela. Informe del progreso durante 1947-1949" [in Spanish, English summary]. *Bol. Tec. Sec. Caña Azucar. Min. Agric. Venezuela,* no. 2: 60 pp., 3 maps. Sept. 1949. Distribution, host plants, and parasites of Venezuelan spp. [P. B.]

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Box, Harold E., "The control of sugar cane moth borers (*Diatræa*) in Venezuela—a preliminary account." *Trop. Agric.* vol. 30: pp. 97-113. Apr./June 1953. Biological control and biology of parasites. [P. B.]

Brčák, Jaroslav, "Beitrag zur Morphologie der Raupe des Apfelwicklers" [in Czech, Russian & English summaries]. *Acta. Soc. Ent. Čechoslovenicæ,* vol. 50: pp. 17-28, 6 figs. 20 Jan. 1954. Describes larva of *Carpocapsa pomonella. C. pyrivora* is not found in Czechoslovakia. [J. M.]

Brčák, J, "Nonparasitical mortality in the progeny of some Lepidoptera" [in Czech, Russian & English summaries]. *Folia Zool. Ent.,* vol. 2: pp. 159-166, 4 figs. Oct. 1955. Discusses the nonparasitical mortality of eggs and caterpillars of *Plusia gamma, Spilosoma lubricipeda, Ourapteryx sambucaria, Acidalia aversata, Lymantria monacha, Nænia typica, Cybosia mesomella, Pachytelia unicolor.* [J. M.]

Breniere, J., "Les principaux insectes nuisibles à la canne à sucre dans les territoires et départements français d'outre mer" [in French]. *Agron. Trop.,* vol. 8: pp. 354-362, 5 figs. July/Aug. 1953. Describes appearance and biology of *Sesamia vuteria* and *Diatræa saccharalis,* on sugar cane; records some parasites. [P. B.]

Brown, Earl E., "Life cycle of Lesser Apple Worm in northeastern Oregon." *Journ. Econ. Ent.,* vol. 46.: p. 163. Feb. 1953. *Grapholitha prunivora.*

Burmann, Karl, "Der 'Matterhornbärenspinner' (*Orodemnias cervini* Fall.) ein schutzbedürftiger Schmetterling unserer Heimat" [in German]. *Ent. Nachrbl.,* vol. 3: pp. 173-177. Oct./Nov. 1951. Describes extremely rigorous conditions to which this high alpine species is exposed—including serious overcollecting. [P. B.]

Burmann, Karl, "Eine Zucht von *Cidaria* (*Larentia*) *kollariaria* H. S. (Lepidoptera, Geometridæ)" [in German]. *Ent. Nachrbl.,* vol. 3: pp. 185-188. Oct./Nov. 1951. Records rearing of this moth on *Valeriana* spp. [P.B.]

Burmann, Karl, "Aus dem Leben der *Pieris callidice* Esp.—Falter" [in German]. *Ent. Nachrbl.,* vol. 4: pp. 81-84. Apr./Dec. 1952. Flight period and adult habits in high Alps. [P. B.]

Burmann, Karl, "Aus dem Leben von *Semioscopis anella* Hb. (Lepidoptera, Gelechiidæ)" [in German]. *Zeits. Wiener. Ent. Ges.,* vol. 38: pp. 27-30. 1 March 1953. Notes on flight habits of this early species (seen flying at 4° C!); records mating of ♀ with ♂ of related *S. avellanella.* [P. B.]

Burmann, Karl, "Die Entwicklung von *Endrosa*-Arten in zwei getrennten Stämmen (Lepidoptera, Arctiidæ)" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 38: pp.72-75, 2 figs. 1 April 1953. Reports 2 local flight periods (May, July) in *E. aurita* ssp; thinks development requires one year and population consists of two separate strains with staggered adult stage. [P. B.]

Buzacott, J. H., "Insects associated with sugar cane in New Guinea." *Techn. Commun. Bureau of Sugar Exp. Sta. Queensland,* 1953, nos. 1/2: pp. 23-30. Records *Melanitis leda bankia, Phragmatiphila truncata,* and *Cosmopteryx* sp. [P. B.]

Cannon, R. C., "Investigations in the control tof the Potato Tuber Moth, *Gnorimoschema operculella* Zell. (Lepidoptera: Gelechiidæ) in north Queensland." *Queensland Journ. Agric. Sci.,* vol. 5: pp. 107-124. Including biological notes.

Cannon, R. C., & A. Hegarty, "An outbreak of grass webworm in Atherton Tableland pastures." *Queensland Agric. Journ.,* vol. 65: pp. 402-405, 5 figs. 1 Dec. 1947. Biology and control of *Calamotropha leptogramella.*

Casey, Jewell, "Do you know what they are?" *Frontiers,* vol. 12: pp. 110-111, 6 figs. Apr. 1948. Figures pupæ and adults of Monarch and Polyphemus Moth. [P. B.]

Čepelák, Jiří, "I^{ere} contribution à la connaissance des tachinaires tchèques (Dipt. Calliph.)" [in Czech, Russian & French summaries]. *Acta Soc. Ent. Čechosloveniæ,* vol. 49: pp. 81-87. 1 Oct. 1952.

Čepelák, Jiří, "II^{e} contribution à la connaissance des tachinaires tchèques (Dipt. Larvævoridæ)" [in Czech, Russian and French summaries]. *Acta Soc. Ent. Čechosloveniæ,* vol. 49: pp. 169-180. 15 Nov. 1952. Lists a number of parasite spp. from Bohemia with remarks on their hosts among lepidopterous larvæ. [J. M.]

Chiarelli de Gahan, Angelina, & Enrique A. Touron, "Datos biologicos de *Proxenus rionegrensis* (i. l.)" [in Spanish]. *Revista Invest. Agric.,* vol. 4: pp. 139-151, 3 figs. "Jan." [Oct.] 1950. Detailed description of early stages and biology; figures all stages. [P. B.]

Christensen, J. J., & C. L. Schneider, "European Corn Borer (*Pyrausta nubilalis* Hbn.) in relation to shank, stalk, and ear rots of corn." *Phytopathology.* vol. 40: pp. 284-291, 3 figs. Mar. 1950.

Chu, N. F., *How to know the immature insects.* 234 pp., 631 figs. Dubuque: Wm. C. Brown & Co., 1949. A useful illustrated key to families, including both larvæ and pupæ of the more important families of Lepidoptera. General account of immature stages and directions for collecting. [P. B.]

Crich, W. V., "Giant silkworm moths." *Canad. Geogr. Journ.,* vol. 39: pp. 33-35, 3 figs. July 1949. Luna, Cecropia, Polyphemus—photos and notes.

Crosson du Cormier, A., P. Guérin, & H. de Toulgoët, "Nouvelle note sur *Boloria aqilonaris* Stichel" [in French]. *Rev. franç. Lépid.,* vol. 14: pp. 21-23, 1 pl. 1953. Proof that *B. aquilonaris* (=*arsilache* auct.) is a good species; also biological notes on this species. [P. V.]

Danilevskii, A. S., "Leaf rollers (Laspeyresiinæ) damaging seeds of oak and other deciduous varieties in the forested steppe area" [in Russian]. *Uchenye Zap. Leningrad Univ. Ser. Biol. Nauk,* vol. 25: p. 249. 1950. [Not seen].

Darteville, Edmond, "Sur un hespéride des environs de Léopoldville et remarques sur la valeur alimentaire des chenilles de Lépidoptères" [in French]. *Lambillionea,* vol. 51: pp. 12-16, 18-22, 1 fig. 25 Feb., 25 April 1951. Describes biology of *Cœliades libeon,* a common and gregarious feeder on various trees; discusses food value of these and other caterpillars, which are eaten by natives. [P. B.]

Day, M. F., I. B. Common, J. L. Farrant, & Coralie Potter, "A polyhedral disease of a pasture caterpillar, *Pterolocera amplicornis* Walker (Anthelidæ)." *Australian Journ. Biol. Sci.,* vol. 6: pp. 574-579, 4pls., 1fig. Nov. 1953.

Deschamps, M., "Insectes nuisibles aux cultures et insects prédateurs récemment observés dans le Nord Cameroon" [in French]. *Agronomie Trop.,* vol. 9: pp. 174-182. March/April 1954. Tables of insects attacking cultivated plants, arranged by plant spp.; includes numerous Lepidoptera (Tineidæ, Pyralidæ, Gelechiidæ, Noctuidæ, Hylophilidæ, Arctiidæ, Hesperiidæ, Nymphalidæ); also lists nature of damage done, and recorded parasites. [P. B.]

Dethier, V. G., "Evolution of feeding preferences in phytophagous insects." *Evolution,* vol. 8: pp. 33-54, 1 fig. March 1954. Review article, with numerous examples taken from Lepidoptera.

Diadechko, N. P., "Biological methods of controlling coleophorids in orchards" [in Russian]. *Visnyk Akad. Nauk URSR,* vol. 25: pp. 68-69. Aug. 1954. *Coleophora hemesabiella.* [Not seen].

Dick, W. D., "The life history of the Cupid Blue (*Euchrysops cnejus cnejus* Waterhouse and Lyell)." *Queensland Nat.,* vol. 13: pp.79-81. 1947.

Dicker, G. H. L., & J. B. Briggs, "A note on the Small Ermine Moth, *Yponomeuta padella malinella* Zell." *Ann. Rept. E. Malling Res. Sta.,* 1951: 172-173, 1 pl. June 1952. Biology and control.

Dikasova, E. T., "Investigation of Mulberry Silkworm gut which was obtained from moths infected with yellow disease" [in Russian]. *Mikrobiologiia,* vol. 18: pp. 356-360. July/Aug. 1949. [Not seen.]

Dilley, Willard E., "A colorful hawkmoth larva." *Everglades Nat. Hist.,* vol. 1: p. 129. Sept. 1953. Records *Pholus fasciatus* feeding on *Jussiæa peruviana.* [P. B.]

Docteurs van Leeuwen, W. M., "Door vlinders gevormde gallen" [in Dutch, English summary]. *Tijdschr. Plantenziekten,* vol.59: pp. 198-199. 1953.

Dodds, J. G., "Biological flora of the British Isles. *Plantago coronopus* L." *Journ. Ecol.,* vol. 41: pp. 467-478, 2 figs. Aug. 1953. Records two spp. of Gelechiidæ feeding on this plant. [P. B.]

Drachovská-Šimanová, Mir., "Insect-parasites on sugar-beet in view of entomology" [in Czech, Russian & English summaries]. *Folia Ent.,* vol. 14: pp. 106-119, 7 figs. 1 Oct. 1951. Lists some spp. of Lepidoptera as pests of sugar beet in Czechoslovakia. [J. M.]

Drachovská-Šimanová, M., "Výskyt makadlenky řepné (*Phthorimæa ocellatella* Boyd) na Slovensku" [in Czech, Russian & English summaries]. *Folia Zool. Ent.,* vol. 1: pp. 223-229, 1 col. pl. 1952. Biology and control of the sp. in S. Slovakia. [J. M.]

Duiven, J. Mart, "*Lyonetia clerckella* L., de mineerrups van het kerseblad" [in Dutch]. *Levende Natuur,* vol. 50: pp. 8-9, 2 figs. Jan. 1947.

Duiven, J. Mart, "*Coleophora cæspititiella,* de zakdrager van de trekrups" [in Dutch]. *Levende Natuur,* vol. 50: pp. 63-64, 1 fig. April 1948.

Grechkin, V. P., "Clearwing moths are pests of poplar" [in Russian]. *Lesnoe Khoziastvo,* vol. 2, no. 6: pp. 86-90. June 1949. [Not seen].

Greig-Smith, P., "Biological Flora of the British Isles. *Urtica* L." *Journ. Ecol.,* vol. 36: pp. 339-355, 5 figs. Dec. 1948. Larval food plant of *Hypena proboscidalis, Aglais urticæ, Nymphalis io, Vanessa atalanta, Notarcha ruralis, Eurrhypara urticata, Simæthis fabriciana.* [P. B.]

Griot, Mario, & Amelia Icart, "Observaciones sobre '*Balcarcia bergi*' Brethes, parasito del 'bicho de cesto' " [in Spanish]. *Revista Invest. Agric.,* vol. 2: pp. 197-204, 11 figs. "1948" [1949]. Describes all stages and biology of parasite of *Oiketicus kirbyi.* [P. B.]

Groves, Joan R., "A preliminary account of the Summer Fruit Tortricid, *Adoxophyes orana* (F. R.), in Great Britain." *Ann. Rept. E. Malling Res. Sta., 1951*: pp. 152-154, 2 pls. June 1952.

Gusev, V. M., "On the destruction of *Pyrausta nubilalis* larvæ by woodpeckers" [in Russian]. *Priroda,* vol. 36, no. 9: p. 78. Sept. 1947. [Not seen.[

Hackray, J., "Élevage de *Lampropteryx suffumata* Hb." [in French]. *Lambillionea,* vol. 52: pp. 47-48. 25 Aug. 1952. Describes rearing on *Gallium mollugo.* [P. B.]

Haggett, G., "*Rhodometra sacraria* (Lep. Geometridæ) in Great Britain, with particular reference to its occurrence in west Sussex, 1947." *Entomologist,* vol. 85: pp. 49-56. Mar. 1949. Distribution, migration, biology, variation. [P. B.]

Haggett, G., "Observations on a colony of *Anepia irregularis* Hufnagel in Norfolk (Lep. Noctuidæ)." *Entomologist,* vol. 85: pp. 36-38. Feb. 1952

Hall, Irvin M., "Observations on *Perezia pyraustæ* Paillot, a microsporidian parasite of the European Corn Borer." *Parasitol.*, vol. 38: pp. 48-52, 1 pl. Feb. 1952. Describes life cycle; parasite reared on *Junonia cœnia* larvæ. [P. B.]

Hall, W. J., "Insect pests in British colonial dependencies: a half yearly report." *FAO Plant Protect. Bull.*, vol. 2: pp. 81-82. March 1954. Includes records of various Lepidoptera: *Artona catoxantha* (Singapore, on coconut); bollworm and stem borers in Nigeria; sugar cane pests (Mauritius); fruit moths & coffee leaf miner (Dominica); *Calpodes ethlius*, on arrowroot (St. Vincent). [P. B.]

Hase, Albrecht, "Über die Eiablage und Fruchtbarkeit der Hausglucke (*Agrotis pronuba*)" [in German]. *Natur und Volk*, vol. 82: pp. 160-161, 1 fig. 1 May 1952. Reports egg mass containing nearly 1600 eggs. [P. B.]

Hašek, Josef, "Pídalka *Pœcilopsis isabellæ* Harr. původce zîru na modřínech" [in Czech]. *Acta Soc. Ent. Čechoslovenicæ*, vol. 49: pp. 239-240. 15 Dec. 1952. Records larvæ as a pest of *Larix* in Moravia. [J. M.]

Helson, G. A. H., "Outbreaks and new records. July-August 1952. New Zealand." *Plant Prot. Bull.*, vol. 1: pp. 29-30. Nov. 1952. *Selidosema suavis*, on *Pinus radiata; Lithocolletis messaniella*, on various oaks, beech, etc. *Gracilaria azaleella*, new to New Zealand. [P. B.]

Hempel, Adolf, "Estudo da alimentaçao natural de aves silvestres do Brasil" [in Portuguese, English summary]. *Arq. Inst. Biol. São Paulo*, vol. 19: pp. 237-268. 1949. Stomach contents of 280 birds belonging to 63 spp., with special reference to *Rhynchotus rufescens* and *Nothura maculosa.* Lepidoptera not determined below order. [P. B.]

Herter, Konrad, "Springböhnen" [in German]. *Natur und Volk*, vol. 83: pp. 23-30, 9 figs. 1 Jan. 1953. Biology of *Carpocapsa saltitans*, the jumping bean caterpillar. [P. B.]

Hill, A. R., "Insect pests of cultivated raspberries in Scotland." *Trans. 9th Int. Congr. Ent.*, vol. 1: pp. 589-592. March 1953. Records *Lampronia rubiella* Bjerk. [A. D.]

Hohl, F., "Remarques biologiques" [in French]. *Bull. Soc. Ent. Mulhouse* 1953: p. 71. Nov. 1953. Biological notes on *Calocampa exoleta, Papilio machaon, Lasiocampa quercus, Dicranura vinula.* [P. B.]

Holoway, C. F., & G. H. Bergold, "Iron content of an insect virus." *Science*, vol. 117: pp. 251-252. 6 Mar. 1952. Pathogen of *Bombyx mori.*

Howard, H. W., & A. G. Lyon, "Biological flora of the British Isles. *Nasturtium officinale* R. Br." *Journ. Ecol.*, vol. 40: pp. 228-238. Feb. 1952. Larval food plant of *Pieris brassicæ* and *P. napi.* [P. B.]

Hughes, Kenneth M., "A demonstration of the nature of polyhedra using alkaline solutions." *Journ. Bact.*, vol. 59: pp. 189-195, 2 pls. Feb. 1950. Pathogens of *Prodenia pacifica* and *Colias eurytheme.* [P. B.]

Hughes, Kenneth M., & Clarence G. Thompson, "A granulosis of the omnivorous looper, *Sabulodes caberata* Guenée." *Journ. Infect. Diseases*, vol. 89: pp. 173-179, 2 pls. Sept./Oct. 1951. New virus attacking fat bodies. [P. B.]

Huzian, L., "New data on the biology of *Phthorimæa ocellatella*" [in Magyar]. *Agrartudomany*, vol. 3: p. 440. 1951. [Not seen.]

Il'inskii, A. I., "Pine moth, pine looper moth and gypsy moth" [in Russian]. *Lesnoe* 2, no. 1: pp. 85-93. Jan. 1949. [Not seen].

Irwin, Margaret C., "The California Oak Moth." *Santa Barbara Mus. Nat. Hist. Mus. Leaflet*, vol. 22: pp. 38-42, 1 pl. April/May 1947. Also as *Special Bull.* no. 2; 1947. Biology and control of *Phryganidia californica;* lists parasites and predators; figures all stages. [P. B.]

Iwase, Tarô, "The hibernation of the Long-Tailed Blue (*Lampides bœticus* L.) in Japan." *Entomologist*, vol. 84: pp. 234-236. Oct. 1951. Biology; possibly a yearly immigrant. [P. B.]

Iwase, Tarô, "Remarkable observations by young Japanese lepidopterists." *Lepid. News*, vol. 6: p.43. 8 Aug. 1952.

Iwase, Tarô, "Aberrant feeders among Japanese lycænid larvæ. Appendix: Entomophagous moths in Japan." *Lepid. News*, vol. 7: pp. 45-46. 29 July 1953.

Iwase, Tarô, "The sixth aberrant feeder in Japan—*Spindasis takanonis* (Lycænidæ)." *Lepid. News*, vol. 9: pp. 13-14, 1 fig. 8 April 1955.

Janjua, Nazeer Ahmed, & M. Maqsud Nasir, "*Euzophera punicella* Moore in Baluchistan." *Indian Farming*, vol. 8: pp. 549-550. Nov. 1947. Biology; on pomegranates and other fruits. [P. B.]

Jary, S. G., W. H. Rolfe, & K. Carpenter, "The Leek moth." *Agriculture*, vol. 54: pp. 563-569. March 1948. Biology and control.

Jasič, J., D. Povolný, & L. Weismann, "Beitrag zum Studium der Bionomie der Rübenmotte (*Gnorimoschema ocellatellum* Boyd)" [in Czech, Russian & German summaries]. *Folia Zool. Ent.*, vol. 3: pp. 243-252, 1 pl., 4 figs. Dec. 1954.

Jepson, W. F., "Stem borers of cereals and sugar cane." *Plant. Protect. Overseas Rev.*, vol. 2, no. 2: pp. 15-21. Apr. 1951. Life history notes on *Busseola fusca, Sesamia, Diatræa, Schœnobius bipunctifer.* [P. B.]

Jepson, W. F., "Stalk borers of tropical cereals and sugar cane." *Trans. 9th Int. Congr. Ent.*, vol. 1: pp. 786-790. March 1953.

Judd, W. W., "Hymenoptera and an inquiline moth reared from the goldenrod gall caused by *Gnorimoschema gallæsolidaginis* Riley (Lepidoptera)". *Proc. Nova Scotia Inst. Sci.*, vol. 22, part 4: pp. 1-7. July 1951. Records *Epiblema scudderiana* and 4 spp. of parasites. [P. B.]

Judd, W. W., "The White Veined Dagger, *Simyra henrici* Grt. (Lepidoptera: Phalænidæ), and its parasites reared from Cat-tail, *Typha* spp." *Proc. Nova Scotia Inst. Sci.*, vol. 23: pp. 115-119. Feb. 1954. Records 2 braconids and 1 tachinid as parasites. [P. B.]

Kalandadze, L. P., & V. S. Dzashi, "An omnivorous leaf roller, *Tortrix* (*Eulia*) *politana* Haworth, attacking tea" [in Russian]. *Dokl. Vses. Akad. Sel'sk. Nauk im Lenina*, vol. 14, no. 9: pp. 3-7. 1949. [Not seen.]

Kalshoven, L. G. E., *De plagen van de cultuurgewassen* in Indonesië. The Hague: W. van Hoeve. 1949-1951. See reviews in *Lepid News*, vol. 4: p. 50; vol. 6: p. 80.

Kamal, M., "Investigations on the biological control of the Cotton Leaf Worm, *Prodenia litura*, in Egypt." *Trans. 9th Int. Congr. Ent.*, vol. 1: pp. 757-765. March 1953.

Kasy, Freidrich, "Eigenartige Nahrungsverflüssigung bei *Augiades sylvanus* Esp." [in German]. *Ent. Nachrbl.*, vol. 3: pp. 184-185. Oct./Nov. 1951. An individual of this species, settling on the author's hand, repeatedly deposited a drop of water from the anus and sucked it up again with the proboscis. [P. B.]

Khadzhibeili, Z. K., "Material on the study of the Fig Pyralis (*Simæthis nemorana* Hb.) in Kakhetia." [in Russian]. *Soobshch. Akad. Nauk Gruzinskoi SSR.*, vol. 11: pp. 309-314. 1950. [Not seen].

Klimesch, J., "Die Raupe von *Depressaria* (*Schistodepressaria*) *cervicella* HS. (Lep., Œcophoridæ)" [in German]. *Zeits. Wiener Ent. Ges.*, vol. 38: pp. 22-25, 9 figs. 1 March 1953. Describes larva minutely, and pupa briefly; on *Trinia glauca.* [P. B.]

Knowlton, G. F., "Predators of *Vanessa cardui.*" *Lepid. News*, vol. 7: p.55. 29 July 1953.

Knudsen, John P., "A new host plant record for *Strymon liparops.*" *Lepid. News*, vol. 9: pp. 11-12. 8 April 1955.

Komárek, Julius, & Václav Skuhravý, "Der Einfluss der Temperatur auf die periodische Massenvermehrung des Schwammspinners (*Lymantria dispar* L.). Vorläufige Mitteilung" [in Czech, Russian & German summaries]. *Acta Soc. Ent. Čechosloveniæ*, vol. 49: pp. 16-30. 1 Oct. 1952. On the biology of *L. dispar.* [J. M.]

Komarova, O. S., "Life cycle and conditions of the development of the Eudemis Moth (*Polychrosis botrana* Schiff.)" [in Russian]. *Zool. Zhurn.*, vol. 33: pp. 102-113. Jan/Feb. 1954. [Not seen].

Konikov, A. S., "Rearing Oak Silkworm on *Betula verrucosa* on the collective farms of western Siberia" [in Russian]. *Dokl. Vses. Akad. Sel'sk. Nauk in. Lenina*, vol. 17, no. 9: pp. 40-43. 1952. [Not seen.]

Korringa, P., "Nachtelijk bezoek aan *Prunus serotina*" [in Dutch]. *Levende Natuur*, vol. 50: pp. 26-29, figs. Feb./March 1947.

Kozhanchikov, I. V., "Multivorousness of animals and variability of the environment" [in Russian]. *Zool. Zhurn.*, vol. 31: pp. 793-801. Nov./Dec. 1952. [Not seen.]

Kozhanchikov, I. V., "Contribution to the understanding of the mass propagation of insects" [in Russian]. *Zool. Zhurn.*, vol. 32: pp. 195-202. Mar./Apr. 1953. [Not seen].

Kraemer, G. P., "Beitrag zur Biologie von *Amicta quadrangularis* Heyl. (Lep. Psychidæ)" [in German]. *Zeits. Wiener Ent. Ges.*, vol. 34: pp. 160-164, 1pl. 31 Dec. 1949. Case structure, sex ratio, parasitism. [P. B.]

Kudla, Miloslav, "Quelques notes sur l'écologie et l'apparition de l'espèce *Scolitantides orion* Pall. (Lycænidæ)" [in Czech, French summary]. *Acta Soc. Ent. Čechosloveniæ*, vol. 48: pp. 132-134. 30 Nov. 1951. Discusses life history of larva and gives some remarks on ecology of sp. [J. M.]

Kuznetsov, V. I., "Problems in adaptation of lepidopterous insects to new food conditions" [in Russian]. *Trudy Zool. Inst. Akad. Nauk SSSR*, vol. 11: pp. 166-181. 1952. [Not seen.]

van der Laan, P. A., "Epidemiology of some tobacco pests in Deli (Sumatra)." *Trans. 9th Int. Congr. Ent.*, vol. 1: pp. 795-798. March 1953. Mentions *Phthorimæa heliopa, Prodenia litura, Plusia signata,* and *Heliothis assulta* [A. D.]

Lall, L. S., "Preliminary observations on the bionomics of Potato Tuber Moth (*Gnorimoschema operculella* Zell.) and its control in Bihar, India." *Indian Journ. Agric. Sci.*, vol. 19: pp. 295-306. June 1949. Describes early stages and habits. [P. B.]

Lambert, J. M., "Biological flora of the British Isles. *Glyceria maxima* (Hartm.) Holmb." *Journ. Ecol.*, vol. 34: pp. 310-344, 7 figs. Aug. 1947. Larval food plant of *Leucania straminea, Schœnobius forficellus,* and *Elachista poæ.* [P. B.]

Laskey, Amelia R., "Blue Jays feed tent caterpillars to nestlings." *Wilson Bull.*, vol. 66: pp. 65-66. March 1954. *Malacosoma americana.*

Latham, Roy, "*Fagitana littera* reared from larva." *Lepid. News,* vol. 7: p. 172. 12 Feb. 1954.

Le Charles, L., "La vie et les metamorphoses de *Charaxes jasius* Linné" [in French]. *Rev. franç. Lépid.*, vol. 13: pp., 45-52, 4 pls. "Mar.-Apr." [31 July 1951]. Detailed description of life history and habits; good figures of all stages and eclosion. [P. B.]

Leefmans, S., "Over enige insection in lisdodden" [in Dutch, English summary]. *Tijdschr. Plantenziekten,* vol. 59: pp. 201-203, 3 figs. 1953. Describes life-history and figures some stages of *Limnæcia fragmitella* Stt. (Momphidæ). [A. D.]

Lefevre, P.-C., "*Acræa acerata* Hew. parasite de la patate douce" [in French]. *Bull. Agric. Congo Belge,* vol. 39: pp. 49-76, 10 figs. March 1948. Describes and figures all stages; lists food plants (*Ipomœa* spp., *Lepistemon*) and parasites. [P. B.]

Le Marchand, S., "Une mine inépuisable: les *Stigmella* (*Nepticula*) (*Microlépidoptéres, Stigmellidæ*). Contribution à leur étude" [in French]. *Rev. franç. Lépid.*, vol. 13: pp. 98-102, 138-142. "Sept./Oct." [28 Dec.] 1951, "Nov./Dec. 1951" [28 March 1952]. Describes biology of genus, and cocoons of 46 spp. [P. B.]

Lems, Kees, "*Porthesia* feigning death." *Lepid. News,* vol. 6: p. 42. 8 Aug. 1952.

de Lesse, H., "Contribution á l'étude du genre *Erebia* (12e note). Description des premiers états." [in French]. *Rev franc. Lépid.*, vol. 14: pp. 167-179, 1 pl., 18 figs. Nov. 1954. Descriptions of the early stages of *E. tyndarus, E. ottomana, E. mnestra;* with an introduction on breeding and collecting larvæ, and notes on the terms used in the descriptions. [P. V.]

de Lesse,H., "Contribution á l'étude du genre *Erebia* (13e note). Description des premiers états" [in French]. *Rev. franç. Lépid.*, vol. 14: pp. 251-257, 1 pl., 15 figs. March 1955. Study of the first stages of *E. lefebvrei, E. montanus* (=*goante*), *E. scipio.* [P. V.]

Lever, R. J. A. W., "An early reference to possible biological control of a coconut pest (*Levuana iridescens* B.-B.)." *Malayan Agric. Journ.*, vol. 31: p. 132. Apr. 1948. Quotes record of fungus *Botrytis necans* attacking *Artona catoxantha.* [P. B.]

Lewin, Ralph A., "Biological flora of the British Isles. *Sonchus* L. (*S. oleraceus* L. and *S. asper* (L.) Hill)." *Journ. Ecol.*, vol. 36: pp. 203-223, 3 figs. July 1948. Larval food of *Polia advena, Cucullia umbratica, C. lactucæ, Hadena serena, H. dysodea, Depressaria badiella, Eucosma expallidana, Argyroploce purpurana.* [P. B.]

Lockwood, L. P., "Notes on insects associated with *Lupinus polyphyllus* Lindl. in the Pacific northwest." *Pan-Pacific Ent.*, vol. 27: pp. 149-156. 1951. *Papaipema pertincta* and *Hystricophora paradisiæ,* stem and root borers respectively, are among the insect associates of this plant. [J. T.]

Löberbauer, Rudolf, "Zur Verbreitung ünd Biologie von *Phytometra v-argenteum* Esp." [in German]. *Zeits. Wiener Ent. Ges.*, vol. 35: pp. 61-68, 1 map. 1 June 1950. Distribution; foodplant *Thalictrum aquilegifolium.* [P. B.]

Long, D. B., "Effects of population density on larvæ of Lepidoptera." *Trans. Roy. Ent. Soc. London,* vol. 104: pp. 541-591, 6 pls., 14 figs. 31 Dec. 1953. Describes experiments on effect of crowding on larval color, structure, and behaviour, performed on 10 spp. (Noctuidæ, Pieridæ, Saturniidæ, Sphingidæ) in 7 of which the crowded larvæ were darker than normal. The darker color and shorter development of crowded larvæ appear to be correlated with their greater activity. [P. B.]

Lower, H. F., "A granulosis virus attacking the larvæ of *Persectania ewingii* Westw. (Lepidoptera: Agrotidæ) in South Australia." *Austral. Journ. Biol. Sci.*, vol. 7: pp. 161-167, 1 fig. 1954.

Lozovoi, D. I., "*Pinus eldarica* and its resistance in relation to injurious insects" [in Russian]. *Priroda,* vol. 36, no. 9: pp. 74-76. Sept. 1947. *Rhyacionia buoliana.* [Not seen.]

MacCreary, Donald, & H. E. Milliron, "Occurrence of the Smartweed Borer and the European Corn Borer in apples." *Journ. Econ. Ent.,* vol. 45: p. 348. Apr. 1952. *Pyrausta ainsliei, P. nubilalis.*

McGaha, Young John, "The limnological relations of insects to certain aquatic flowering plants." *Microfilm Abs.,* vol. 11: pp. 476-477. 1951. Abstract only.

Machacek, Sepp., "*Hypogymna morio* L. als Schädling" [in German]. *Ent. Nachrbl.,* vol. 3: pp. 198-200. Dec. 1951. Records destructive outbreak on grass. [P. B.]

Macqueen, J., "Notes on two species of Australian lycænid butterflies, *Ialmenus ictinus* Hewitson and *Ialmenus* sp.? (*schraderi* (Feld.)?)." *Queensland Nat.,* vol. 13: pp. 75-79. 1947. Life history notes on two sibling species. [I. C.]

McVean, D. N., "Biological flora of the British Isles. *Alnus* Mill." *Journ. Ecol.,* vol. 41: pp. 447-466, 3 figs. Aug. 1953. Lists 30 spp. of Lepidoptera feeding on *A. glutinosa,* with their alternative foodplants. [P. B.]

Madge, P. E., "A field study of the biology of the Underground Grass Caterpillar, *Oncopera fasciculata* (Walker) (Lepidoptera: Hepialidæ), in South Australia." *Austral. Journ. Zool.,* vol. 2: pp. 193-204, 3pls., 2 figs. 1954. Account of the biology and behaviour of a pest of sown pastures in South Australia and southern Victoria. [I. C.]

Madsen, Harold F., Arthur D. Borden, Robert E. Clark, & James E. DeTar, "Leaf miner on deciduous fruits." *Calif. Agric.,* vol. 7, no. 11: pp. 4-5, 5 figs. Nov. 1953. Biology and control of *Lithocolletis cratægella,* on pear, apple, and cherry. [P. B.]

Makino, Sajiro, & Kazuo Saito, "Results of gonadectomy and gonadal transplantation in the sex races of *Lymantria dispar.*" *Lepid. News,* vol. 7: pp. 7-8. 20 Apr. 1953.

Manickavasagar, P., "The Potato Tuber Moth *Gnorimoschema operculella* (Zeller). (Order Lepidoptera family Gelechiidæ)." *Trop. Agriculturist,* vol. 109: pp. 118-121, 1 pl. 1953. Describes and figures all stages.

Marden, Luis, "Spain's silkworm gut." *Nat. Geogr. Mag.,* vol. 100: pp. 100-108, 10 figs. July 1951. Popular account of sericulture and biology of *Bombyx.* [P. B.]

Marikovskii, P. I., "Tamarisk moth—*Amblypalpis tamaricella* Dan. and the phenomenon of connected diapause of its parasite" [in Russian]. *Zool. Zhurn.,* vol. 31: pp. 673-675. Sept./Oct. 1952. [Not seen.]

Markin, A., "American White Moth" [in Russian]. *Sad i Ogorod, 1953,* no. 7: pp. 38-39. July 1953. *Hyphantria cunea.* [Not seen].

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Massee, A. M., "Notes on some interesting insects observed in 1948." *Ann. Rept. E. Malling Res. Sta., 1948*: pp. 102-106, 1pl. Oct. 1949. Biological notes on *Eupithecia assimilata, Cacœcia piceana,* and some other pest species. [P. B.]

Massee, A. M., "Notes on some interesting insects observed in 1949." *Ann. Rpt. E. Malling Res. Sta., 1949*: pp. 126-131, 2 pls. July 1950. Biological notes, including *Acronycta rumicis, Hepialus lupulinus, Zeuzera pyrina.* [P. B.]

Massee, A. M., "Notes on some interesting species observed in 1950." *Ann. Rept. E. Malling Res. Sta., 1950*: pp. 141-147. June 1951. Biological notes on *Triphæna comes, Zeuzera pyrina, Sesia myopæformis, Tortrix diversana, Lithocolletis* sp., and some other pest species. [P. B.]

Massee, A. M., "Notes on some interesting insects observed in 1951." *Ann. Rept. E. Malling Res. Sta. 1951*: pp. 155-161. June 1952. Biological notes on some pest species, including *Argyresthia conjugella.* [P. B.]

Massee, A. M., "Notes on some interesting insects observed in 1952." *Ann. Rept. E. Malling Res. Sta., 1952*: pp. 146-150. May 1953. Biological notes on pest species, including *Spilosoma lubricipeda* and *Cycnia mendica* on fruit trees. [P. B.]

Matthes, Ernst, "Der Einfluss der Fortpflanzung auf die Lebensdauer eines Schmetterlings (*Fumea crassiorella*)" [in German]. *Zeits. Vergl. Physiol.,* vol. 33: pp. 1-13, 2 figs. 31 Jan. 1951. Reports that egg-laying shortens life of female. [P. B.]

Mazokhin-Porshniakov, G. A., "Predator of tartar maple" [in Russian]. *Les i Step',* vol. 4: p. 81. Apr. 1952. [Not seen.]

Mazokhin-Porshnyakov, G. A., "Research on the ecological system of diurnal Lepidoptera (Lepidoptera, Rhopalocera)" [in Russian.] *Zool. Zhurn.,* vol. 31: pp. 202-212. 1952. [Not seen.]

Mendheim, Hans, "Insekten als Zwischenwirte von Helminthen nebst einigen Bemerkungen über neue Zwischenwirte des Rattenbandwurms" [in German]. *Nachrbl. Bayer. Ent.,* vol. 2: pp. 69-70. 15 Sept. 1953. Among other hosts of the "tape-worm of rats" the following Lepidoptera are listed: *Aglossa dimidiata* (misprinted *"didimiata"*), *"Aphormia gularis"* [sic]), *Pyralis farinalis, Tinea granella,* and *T. pellionella.* [N. O.]

Michelbacher, A. E., & W. W. Middlekauff, "Fungus on Codling Moth." *Calif. Agric.,* vol. 6, no. 3: p. 13, 1 fig. March 1952. *Beauveria* sp. attacking *Carpocapsa pomonella.* [P. B.]

Milianovskii, E. S., "Vine pest *Phassus schamyl* Chr., in Abkhazia" [in Russian]. *Soobshch. Akad. Nauk Gruzinskoi SSR.,* vol. 13: pp. 609-610. 1952. [Not seen.]

Miller, F., "Přástevníček americký—*Hyphantria cunea* Drury—náš nejvážnější škůdce" [in Czech]. *Folia Zool. Ent.,* vol. 1: pp. 16-23, 14 figs. 1952. Gives some information about the new pest in central Europe, and short biological remarks about *H. cunea.* [J. M.]

Miller, F., & M. Řezáč, *"Etiella zinckenella* (Tr.), zavíječ sojový, nový škůdce naší soji" [in Czech, Russian summary]. *Folia Zool. Ent.,* vol. 2: pp. 22-28, 3 pls. 1 April 1953. Describes biology and control. [J. M.]

Miller, William E., "Biological notes on five hymenopterous parasites of pine bud and stem moths in Ohio." *Ohio Journ. Sci.,* vol. 53: pp. 59-63. Jan. 1953. Parasites of *Rhyacionia buoliana* and *Petrova comstockiana.* [P. B.]

Milliron, H. E., "Second report on the performance of European Corn Borer parasites in Delaware." *Ann. Ent. Soc. Amer.,* vol., 46: pp. 115-123, 1 fig. Mar. 1953. Status of 5 imported and 3 native parasites. [P. B.]

Milum, V. G., *"Tinea fuscipunctella* associated with *Tyroglyphus lintneri."* *Journ. Econ. Ent.,* vol. 46: p. 527. June 1953. This debris-feeding species found infesting stored wheat; moth unable to establish itself in wheat in absence of the mite. [P.B.]

Moravskaia, A. S., "Small Gypsy Moth (*Parocneria detrita* Esp.) as a mass destroyer of the oak" [in Russian]. *Zool. Zhurn.,* vol. 31: pp. 367-371. 1952. [Not seen.]

Moucha, J., & D. Weiss, *"Hyphantria cunea* Drury en Europe" [in French]. *Bull. Soc. Ent. Mulhouse* 1953: pp. 65-67, 4 figs. Nov. 1953. Describes biology of this introduced sp. [P. B.]

Moutia, L. Andre, & Claude M. Courtois, "Parasites of the moth-borers of sugar cane in Mauritius." *Bull. Ent. Res.,* vol. 43: pp. 325-359, 7 figs. July 1952. Taxonomic descriptions and biology of parasites of *Proceras sacchariphagus, Sesamia vuteria,* and *Olethreutes schistaceana.* [P. B.]

Munro, J. Alex, "Entomology problems in Bolivia." *FAO Plant Protect. Bull.,* vol. 1-2: pp. 97-101, 2 figs. April 1954. Records *Copitarsia consueta* & *Gnorimoschema operculella* (on potatoes), *Diatræa* spp. (on sugar cane) & other spp. [P. B.]

Narayanan, E. S., "Seasonal pests of crops: *Chilo zonellus* Swinh. and *Hieroglyphus nigrorepletus* Bol., two serious pests of maize and Jowar." *Indian Farming,* n. s., vol. 3, no. 3: pp. 8-9, 32, 2 figs. June 1953. Biology and control.

Narayanan, E. S., "Seasonal pests of crops: some major insect pests of rice and their control." *Indian Farming,* n. s., vol. 3, no. 5: pp. 8-13, 31, 7 figs. Aug. 1953. *Cirphis unipuncta, Schœnobius incertellus, Spodoptera mauritia;* figures stages. [P. B.]

Nashivanko, M. S., "Oak prominent moth (*Notodonta trepida*) in forests of the Ukraine" [in Russian]. *Lesnoe Khoziaistvo,* vol. 6, no. 10: pp. 49-50. Oct. 1953. [Not seen].

Needham, James G., "Notes on a leaf-rolling caterpillar and on some of its associates." *Ecology,* vol. 36: pp. 346-352, 2 figs. April 1955. Biology of *Sylepta silicalis* on *Boehmeria cylindrica* with records of 5 parasites; bilogy of *Machlotica* sp. (Glyphipterygidæ) on the same plant, and note on *Vanessa virginiensis.* [P. B.]

Nestervodskii, V. A., "Death's Head Moth—pest of honeybees" [in Russian]. *Pchelovodstvo,* vol. 29, no. 12: pp. 33-34. Dec. 1952. *Acherontia atropos.* [Not seen.]

Netopil, F., & D. Povolný, *"Pyrausta nubilalis* Hb. als ein Schädling der Zuckerrübe" [in Czech, Russian & German summaries]. *Folia. Zool. Ent.,* vol. 3: pp. 253-258, 3 pls. Dec. 1954. Morphology, biology, & distribution discussed. [J. M.]

Neustetter, Heinrich, "Über die Zucht einiger Geometriden" [in German]. *Ent. Nachrbl.,* vol. 5: pp. 23-26. Mar./Apr. 1953. Notes on rearing *Ellopia prosapiaria, Cidaria variata, Boarmia secundaria,* and *Tephroclystis lanceata,* all on Spruce. [P. B.]

Newcomer, E. J., & F. W. Carlson, "The leaf orlier moth *Pandemis pyrusana."* *Journ. Econ. Ent.,* vol. 45: pp. 1079-1081. Dec. 1952. Biology and control; on fruit trees.

Nordman, A., "Plommonvecklarens, *Laspeyresia funebrana* Tisch. uppträdande i SW-Finland" [in Swedish]. *Notul. Ent.,* vol. 30: pp. 55-56. June 1950 . Notes on the biology and occurrence of *L. funebrana* in Finland. [W. H.]

Nosek, J., & Povolný, *"Pœcilopsis isabellæ* Harr. als Lärchenschädling" [in Czech, Russian & German summaries]. *Folia. Zool. Ent.,* vol. 3: pp. 13-36, 5 pls., 6 figs. March 1954. Discusses the phylogeny of Bistoninæ and Boarmiinæ, the life history, disttribution and ecology of *P. isabellæ* in central Europe. The sp. is recorded as a pest of *Larix* in Moravia. [J. M.]

Novopol'skaia, E. V., "Biology of Brown-tail Moth (*Nygmia phæorrhœa*)" [in Russian]. *Priroda,* vol. 37, no. 9: p. 66. Sept. 1948. [Not seen.]

O'Connor, B. A., "Some insect pests of Tonga." *Agric. Journ. Fiji,* vol. 20: pp. 47-57. June 1949. Records, with notes on biology of some species: *Agonoxena argaula, Tirathaba trichogramma* (on coconut), *Nacoleia octasema* (on banana), *Argyroploce illepida* (on *Inocarpus edulis*), *Gnorimoschema heliopa* (on tobacco), *Plutella maculipennis* (on cabbage), *Plusia chalcytes* (on tomato), and *Othreis fullonia* (fruit-piercing moth). [P. B.]

O'Connor, B. A., "The Banana Scab Moth, *Nacoleia octasema* Meyr., and its control." *Agric. Journ. Fiji,* vol. 20: pp. 84-86. Sept.1949. Describes life history and habits of this pyralid. [P. B.]

O'Connor, B. A., "Biological control of insects and plants in Fiji." *Agric. Journ. Fiji,* vol. 21: pp. 43-54. Mar./June 1950. List of parasites introduced into Fiji, and discussion of the most successful campagins, including those against *Levuana iridescens* and *Tirathaba trichogramma.* [P. B.]

Olalquiaga Fauré, Gabriel, "Pests of edible legumes in Chile." *Plant Prot. Bull.,* vol. 1: pp. 166-168. Aug. 1953. Biological notes on *Epinotia opposita, Rachiplusia nu,* and *Elasmopalpus lignosellus* (on beans); records some parasites of *R. nu* and of cutworms. [P. B.]

Olberg, Günter, "Tagfalter als Vogelernahrung" [in German]. *Natur und Volk,* vol. 82: pp. 188-192, 3 figs. 1 June 1952. Birds feeding on butterflies.

Olivier, R., "*Orthonama obstipata* Fabricius et ses premiers états" [in French]. *Rev. franç. Lépid.,* vol. 13: pp.239-240. "May/June/Sept." [15 Nov.] 1952. Describes rearing on *Anagallia phœnicea* and other plants. [P. B.]

Ovanesian, T. T., "Some biological peculiarities of the organism which produces muscardine in Mulberry Silkworms in Georgian SSR" [in Russian]. *Mikrobiologiia,* vol. 21: pp. 445-448. July/Aug. 1952. [Not seen.]

Ovanesian, T. T., "Effect of garlic phytoncides upon the causative agent of muscardine of silkworm" [in Russian]. *Mikrobiologiia,* vol. 22: pp. 61-63. Jan./Feb. 1953. [Not seen.]

Padii, N. N., "Biological method of controlling the gypsy moth" [in Russian]. *Lesnoe Khoziaistvo,* vol. 6, no. 10: pp. 44-46. Oct. 1953. [Not seen.]

Parsons, Arthur C., "The Catalpa Sphinx Moth and its enemies." *Frontiers,* vol. 13: pp. 48-49, 5 figs. Dec. 1948.

Patočka, Jan, "Obaleči z rodu *Epiblema* Hb. škodící na našich jehličnatých stromech" [in Czech]. *Folia Ent.,* vol. 11: p. 141. 31 Oct. 1948. Lists 3 spp. important in forest entomology: *E. tedella, proximana, nigricana.* [J. M.]

Patočka, J., "Contribution to the biology and ecology of the leaf-roller *Semasia rufimitrana* H.-S (Lep., Tortricidæ)" [in Czech]. *Bull. Int. Acad. Prague,* vol. 50: pp. 405-406. 1949. [Not seen.]

Patočka, Jan, "Bemerkungen über die Tortriciden auf Eichen" [in Czech, Russian & German summaries]. *Folia Zool. Ent.,* vol. 2: pp. 251-266, 41 figs. Dec. 1953. Gives information on biology of some spp. in Slovakia. Discusses Eidmann's ovaria types in some Tortricidæ, and describes eggs, larvæ, pupæ of the most important spp. [J. M.]

Pence, Roy J., & Walter Ebeling, "Orangeworms on avocados." *Yearb. Calif. Avocado Soc., 1950*: pp. 101-104, 6 figs. Biology of *Argyrotænia citrana, Holcocera iceryella.* [P. B.]

Petch, T., "A revised list of British entomogenous fungi." *Trans. Brit. Mycol. Soc.,* vol. 31: pp. 286-304. 29 July 1948. Records some 90 spp. with their hosts, including many Lepidoptera. [P. B.]

Petrov, A. E., "Fly parasites of the Apple Moth (*Hyponomeuta padellus*)" [in Russian]. *Izv. Akad. Nauk Kazakhskoi SSR, Ser. Zool.,* vol. 10: pp. 142-145. 1951. [Not seen.]

Phillips, Marie E., "Biological flora of the British Isles. *Eriophorum angustifolium* Roth. (*E. Polystachion* L.)" *Journ. Ecol.,* vol 42: pp. 612-622, 1 map. July 1954. Records *Elachista albidella* & *E. eleochariella* (miners); *Glyphipteryx haworthana* (seeds); & *Celæna haworthi* (among stem bases) from this plant. [P. B.]

Piggott, C. D., "Biological flora of the British Isles. *Thymus* L." *Journ. Ecol.,* vol. 43: pp. 365-387, 7 figs. Jan. 1955. *Maculinea arion,* 2 Geometridæ, 5 Pyralididæ, 2 Coleophoridæ, 1 gelechiid reported feeding on *Thymus* spp. [P. B.]

Pinker, Rudolf, "*Mesotrosta signalis* Tr." [in German]. *Zeitschr. Wiener Ent. Ges.,* vol. 32: pp. 104-106, 1 pl. 30 June 1948. Describes biology; figures ♂ genitalia and early stages. [P. B.]

Plank, Harold K., "Grassworm injury to lawns in Puerto Rico." *Trop. Agric.,* vol. 24: p. 28. Jan./March 1947. Notes on biology of *Laphygma frugiperda, Pachyzancla phæopterodes, Crambus legonellus.* [P. B.]

Plank, H. K., & H. F. Winters, "Insect and other animal pests of cinchona and their control in Puerto Rico." *Bull. Fed. Agric. Exp. Sta. Mayaguez,* no. 46: 16 pp., 5 figs. Feb. 1949. Records *Choranthus vitellius, Xylophanes pluto, Microgonia vesulia,* unidentified hyponomeutid. [P. B.]

Polozhentsev, P. A., & N. I. Korovina, "Yellowish Moth (*Colymnia trapezina*) is destructive to seeds of the elm family" [in Russian]. *Les i Step',* vol. 4, no. 10: p.81. Oct. 1952. [Not seen.]

Povolný, Dalibor, "*Tortrix* (*Cnephasia* Curt.) *nubilana* Hbn. škůdcem meruňky na jizní Moravě" [in Czech, Russian & English summaries]. *Folia Ent.,* vol. 14: pp. 188-196, 17 figs., 2 photos. 1 Dec. 1951. Short account of occurrence of sp. as a pest of apricot trees in S. Moravia. [J. M.]

Pravdin, F. N., "Principles of the occupation by insects of the axillary organs of Compositæ" [in Russian]. *Dokl. Akad. Nauk SSSR,* vol. 69: pp. 445-447. 1949.

Příhoda, Ant., "*Scenopinus fenestralis* L. (Diptera-Scenopinidæ, Omphralidæ)—destroyer of moth" [in Czech, English sumary]. *Folia Ent.,* vol. 10: pp. 107-110, 2 figs. 31 Dec. 1947. Describes the biology of this fly, whose larvæ attack *Tineola bisselliella* & *Ephestia kuehniella.* [J. M.]

Pruthi, Hem Singh, & Mohan Singh, "Pests of stored grain and their control." *Indian Journ. Agric. Sci., spec. no.*: 88 pp., figs. 1950. Describes and figures early stages of insect pests, including *Sitotroga, Corcyra, Ephestia, Plodia, Pyralis.* [P. B.]

Purefoy, E. Bagwell, "An unpublished account of experiments carried out at East Farleigh, Kent, in 1915 and subsequent years on the life history of *Maculinea arion,* the Large Blue butterfly." *Proc. Roy. Ent. Soc. Lond. A,* vol. 28: pp. 160-162. 31 Dec. 1953. History of the discovery of association between 4th instar larvæ and ants (*Myrmica* spp.) [P. B.]

Pussard, R., "Biologie de *Platyptilia rhododactyla* Schiff. (Lep. Pterophoridæ)" [in French]. *C. R. Soc. Biol.,* vol. 148: pp. 334-336. Feb. 1954. On roses; records 2 parasites. [P. B.]

Randle, Worth S., "Observations on the life history of *Calephelis borealis.*" *Lepid. News,* vol. 7: pp. 119-122, 133-138. 5 Nov. 1953, 12 Feb. 1954.

Rawson, G. W., & P. F. Bellinger, "Sparrows feeding on congregating *Papilio.*" *Lepid. News,* vol. 7: p. 27. 20 Apr. 1953.

Rehfous, M., "Fourmis et chenilles de Lycénides" [in French]. *Mitt. Schweiz. Ent. Ges.,* vol. 27: pp. 38-42. 1954. Notes on the relations between ants and the larvæ of Lycænidæ, species observed, names of the ants visiting such larvæ, and observations on the visits. [P. V.]

Rehfous, M., "Note sur les lépidoptères des champignons" [in French]. *Mitt. Schweiz. Ent. Ges.,* vol. 28: pp. 109-110. April 1955. List of 8 spp. of Lepidoptera seen on fungi in Switzerland; only *Scardia boleti* is restricted to fungi. [P. V.]

Remington, Charles L., & Roger W. Pease, "Studies in food plant specificity. I. The suitability of Swamp White Cedar for *Mitoura gryneus* (Lycænidæ)." *Lepid. News,* vol. 9: pp. 4-6. 8 April 1955.

Rendtorff, R. C., "Investigations on the life cycle of *Oöchoristica ratti,* a cestode from rats and mice." *Journ. Parasitol.,* vol. 34: pp. 243-251, 1 pl. June 1948. *Plodia interpunctella* a suitable intermediate host of this worm. [P. B.]

Richard, F., "*Eriogaster catax* L." [in French]. *Lambillionea,* vol. 52: pp. 26-30. 25 June 1952. Describes rearing on *Cratægus.* [P. B.]

Risbec, J., "I. Les Chalcidoïdes d'A. O. F. II. Les Microgasterinæ d'A. O. F." [in French]. *Mém. Inst. franç. Afr. Noire,* no. 13: 473 pp., 224 figs. 28 June 1951. Systematic account of species (except Chalcididæ), mostly new and mostly based on reared material. Tables of host species are given, including many Lepidoptera. [P. B.]

Risbec, J., "Chalcidoïdes d'A. O. F." [in French]. *Bull. Inst. franç. Afr. Noire,* vol. 13: pp. 1110-1130, 5 figs. Oct. 1951. Records parasites of *Cirphis loreyi, Eublemma gayneri, Cosmopteryx attenuatella;* from French West Africa. [P. B.]

Robinson, Dan, "Garden Bagworm, *Apterona crenulella* (=*helix*) in Nevada and Placer Counties, California." *Bull. Calif. Dept. Agric.,* vol. 62: pp. 25-33, 3 figs. 1953. This wingless parthenogenetic psychid has been found injurious to fruit trees. Illustrations of larviform females and cases, also of leaf injury. [J. T.]

Romanova, V. P., "Leaf rollers (fam. Tortricidæ) of forested steppe areas" [in Russian]. *Zool. Zhurn.*. vol. 31: pp. 361-366. 1952. [Not seen.]

Romanova, Y. S., "The biological method of control with the Annulated Silkworm" [in Russian]. *Dokl. Vses. Akad. Sel'sk Nauk im Lenina,* vol. 16: pp. 30-34. 1951. [Not seen.]

Ronniger, Hermann, "Über *Coleophora flaviella* Mann." [in German]. *Zeitschr. Wiener Ent. Ges.,* vol. 32: pp. 129-142, 1 pl. 30 July 1948. Describes all stages and biology; discusses closely related spp. [P. B.]

Roszypal, Jan, "*Dyspessa ulula* Bkh. ein Schädling am Zweibelgemüse" [in Czech, Russian German summaries]. *Folia Zool. Ent.,* vol. 1: pp. 137-150, 25 figs. 1952. Gives morphology, biology, and control in southern Moravia. [J. M.]

Roszypal, J., "*Dyspessa ulula* Bkh., ein Schädling von Zweibelgemüse" [in German]. *Trans. 9th Int. Congr. Ent.,* vol. 1: pp. 654-659, figs. March 1953. Records this cossid from Czechoslovakia; describes biology and injury to onions. [A. D.]

Roszypal, J., "Treibeule (*Procus strigilis* Cl.), Schädling der Nutzgräser" [in Czech, Russian & German summaries]. *Folia Zool. Ent.,* vol. 3: pp. 151-166, 4 pls., 1 fig. Sept. 1954. Morphology, biology, and control of this sp. Records some hymenopterous parasites of the larva. [J. M.]

Rubtsov, I. A., *Citrus fruit pests and their natural enemies.* [in Russian]. 260 pp. Moscow: Akad. Nauk SSSR. [Not seen].

Rudnev, D. F., "Determination of the egg production of the Gypsy moth by the pupæ" [in Russian]. *Zool. Zhurn.,* vol.30: pp. 224-228. 1951. [Not seen].

Ruivkin, B. V., "*Telenomus verticillatus* Kieffer (Hymenoptera, Scelionidæ)—a parasite of the eggs of *Dendrolimus pini*" [in Russian]. *Ent. Obozr.,* vol. 31: pp. 71-76. 1950. [Not seen.]

Ruivkin, B. V., "Some questions of the biology of *Sturmia inconspicua* Meig. (Diptera, Larvævoridæ) and its economic importance [in Russian]. *Dokl. Akad. Nauk SSSR,* vol. 76: pp. 755-758. 1951.

Ruivkin, B. V., "Parasites of *Dendrolimus pini* in eastern Polesye" [in Russian]. *Dokl. Akad. Nauk SSSR,* vol. 84: pp. 853-856, 2 figs. 1 June 1952.

Saalas, Uunio, *Suomen metsähyönteiset sekä muut metsälle vahingolliset eläimet* [in Finnish]. 719 pp., 653 figs. Helsinki, 1949. An extensive work on the forest insects and other animals injurious to forest trees in Finland. [W. H.]

Salvaterra, Gino, "*Cacœcia rosana* L." *Plant Protect. Overseas Rev.,* vol. 3, no. 1: pp. 18-23, 2 pls. March 1952. Distribution and biology; figures egg masses and adults. [P. B.]

Sarlet, L., "Iconographie des oeufs de Lépidoptères (Faune de la Belgique) (suite)" [in French]. *Lambillionea,* vol. 53: pp. 71-75. "1953" [1954]. Bibliography and description of the eggs of *Leptidea sinapis* and *Aporia cratægi* (both Pieridæ). [P. V.]

Sauer, H. F. G., "Constataçao de himenópteros e dípteros entomófagos no Estado de São Paulo" [in Portuguese]. *Bol. Fitossanit.,* vol. 3: pp. 7-23. "1946" [1947]. Annotated list of reared parasites; hosts recorded but not separately listed. [P. B.]

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Schultz, Victor G. M., "Neue Beiträge zur Schmetterlingskunde. Nr. 26. Die Raupenhäute der *Agrotis* (*Epilecta*) *linogrisea* Schiff., sowie einige Bemerkungen zu Zucht und Lebensweise dieser Art (Lep. Noctuidæ (Agrotidæ))" [in German]. *Nachrbl. Bayer. Ent.*, vol. 1: pp. 68-71. 15 Sept. 1952. Morphology and biology of larva. [N. O.]

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Schultz, Victor G. M., "Neue Beiträge zur Schmetterlingskunde. Nr. 28. Über die Raupe, die Puppe und eine anomale Falterform von *Scopula ternata* Schrk. (*Acidalia fumata* Steph.) (Lep. Geometridæ)" [in German]. *Zeits. Wiener Ent. Ges.*, vol. 38: pp. 95-99, 1 pl. 30 April 1953. Describes larva, pupa, and biology (on *Vaccinium myrtillus);* records and figures adult with reduced forewings. [P. B.]

Schwarz, R., "*Coleophora onopordiella* Z. as rye injurer" [in Czech, English summary]. *Folia Ent.*, vol. 14: pp. 89-93, 1 fig. 31 July 1951. The larva is polyphagous and also attacks *Secale cereale.* Notes on life history and distribution. [J. M.]

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Sieder, Leo, "*Fumea* (nec *Psychidea*) *raiblensis* Mann" [in German]. *Zeitschr. Wiener*
larva, and case. [P. B.]

Sifroshvili, N. A., "Some data on a new orchard pest in Kartla, the moth *Monima* (*Tæniocampa*) *stabilis* View." [in Russian]. *Soobshch. Akad. Nauk Gruzinskoi SSR.*, vol. 13: pp. 175-182. 1952. [Not seen].

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Steinhaus, Edward A., *Insect Microbiology.* xi + 763 pp., 250 figs. Ithaca: Comstock Publ. Co., Inc. 1947. Discusses relationships of bacteria, protozoa, fungi, viruses, etc. with insects and mites, and lists all known pathogens with their hosts. Extensive bibliography. [P. B.]

Steinhaus, Edward A., & Kenneth M. Hughes, "Two newly described species of microsporidia from the Potato Tuberworm, *Gnorimoschema operculella* (Zeller) (Lepidoptera, Gelechiidæ)." *Journ. Parasitol.,* vol. 35: pp. 67-74, 1 pl., 2 figs. Feb. 1949. Describes as new *Nosema destructor, Plistophora californica;* describes symptoms of infections. [P. B.]

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Steinhaus, Edward A., "The susceptibility of two species of *Colias* to the same virus." *Journ. Econ. Ent.*, vol. 45: pp. 897-899. Oct.1952. *C. eurytheme* infected by disease of *C. lesbia*. [P. B.]

Struble, George R., "Unusual pupation site for *Nymphalis californica*." *Lepid. News*, vol. 6: p. 107, 1 fig. 19 Feb. 1953.

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Sussman, Alfred S., "Studies of an insect mycosis. II. Host and pathogen ranges." *Mycologia*, vol. 43: pp. 423-429. 24 Aug. 1951. Reports infestation of Cecropia larvæ by 6 of 20 spp. of *Aspergillus*, and by spp. of *Metarrhizum* and *Fonsecæa*. *A. flavus* attacked 6 other genera of Lepidoptera, but not 2 genera of beetles. Lists recorded hosts of *Aspergillus* spp. [P. B.]

Sussman, Alfred S., "Studies of an insect mycosis. III. Histopathology of an aspergillosis of *Platysamia cecropia* L." *Ann. Ent. Soc. Amer.*, vol. 45: pp. 233-245, 12 figs. June 1952.

Sussman, Alfred S., "Studies of an insect mycosis. IV. The physiology of the host-parasite relationship of *Platysamia cecropia* and *Aspergillus flavus*." *Mycologia*, vol. 44: pp. 493-505, 5 figs. 1952. Infection of pupæ results in a 20-fold increase in oxygen uptake, largely due to host metabolism. [P. B.]

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Taylor, J. Sneyd, "Notes on *Phiala patagiata* Aur., the Karoo Tent Caterpillar." *Ent. Mem. Union S. Africa Dept. Agric.*, vol. 2: pp. 217-229, 2 pls. 1950. Describes and figures all stages; records host plants (especially *Pentzia incana, Walafrida saxatilis*), and several parasites. [P. B.]

Taylor, J. Sneyd, "Notes on further parthenogenetic generations of *Mesocelis* (Lasiocampidæ) from the eastern Karoo." *Proc. Roy. Ent. Soc. London (A)*, vol. 29: pp. 71-75 30 June 1954. Eight generations have been reared without appearance of males. The species, near *M. montana*, feeds on *Ruschia* and *Mestoklema*. [P. B.]

Tevis, Lloyd, Jr., "An outbreak of *Nymphalis californica* near Lake Almanor, California." *Pan-Pacific Ent.*, vol. 29: pp. 201-202. 1953. Relates defoliation of shrubbery by larvæ and eating of larvæ and of pupæ by rodents. Describes mass movement of adults. [J. T.]

Thompson, Clarence G., & Edward A. Steinhaus, "Further tests using a polyhedrosis virus to control the Alfalfa Caterpillar." *Hilgardia*, vol. 19: pp. 411-445. 1950. While largely or entirely an economic paper, this is of interest because of the use of viruses in control projects. The authors state that general recommendations for use of viruses to control Alfalfa Caterpillars canot be made as of the date of this paper. [J. T.]

Tibbets, Ted, & G. F. Knowlton, "*Apterona crenulella* in Utah (Lep., Psychidæ)." *Ent. News*, vol. 63: p. 211. 1952. Larvæ found in large numbers damaging apple trees and native shrubs. Larvæ noted invading homes. [J. T.]

Tilden, J. W., "Microlepidoptera associated with *Baccharis pilularis*. I. Pterophoridæ." *Wasmann Journ. Biol.*, vol. 8: pp. 81-88. 1950. Life history studies of *Oidæmatophorus confusus* and *O. grandis*. [J. T.]

Tilden, J. W., "Microlepidoptera associated with *Baccharis pilularis*. II. Tortricidæ, Phaloniidæ, Gelechiidæ." *Wasmann Journ. Biol.*, vol. 9: pp. 239-254. 1951. One tortricid, one phaloniid, and three gelechiids are treated. [J. T.]

Tilden, J. W., "The digging and provisioning habits of *Ammophila sæva* Smith (Hymenoptera)." *Pan-Pacific Ent.*, vol. 29: pp. 211-218. 1953. This wasp provisions its burrow with larvæ of *Smerinthus cerisyi* (Sphingidæ). [J. T.]

Tomšík, B., & D. Povolný, "Contribution to the knowledge of nutrition of silkworm (*Bombyx mori* L.)" [in Czech, English summary]. *Folia Ent.*, vol. 13: pp. 65-72, 5 figs. 30 June 1950.

Toner, G. C., "Butterflies and a kitten." *Journ. Mammal.*, vol. 36: p. 290. May 1955. Cat feeding on congregating swallowtails. [P. B.]

de Toulgoet, H., "Note sur les premiers états de *Boloria pales Schiff.* et *napæa* Hb." [in French]. *Rev. franç. Lépid.*, vol. 13: pp. 162-165, 1 pl., 4 figs. "Jan./Feb." [31 May] 1952. Describes and figures larvæ and pupæ and distinguishes between them; describes biology. [P. B.]

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Toumanoff, Constantin, & Constantin Vago, "L'effet de l'alcalinité du milieu de culture sur la virulence de *Bacillus cereus* var. *alesti* Toum. et Vago, pour les Vers à Soie" [in French]. *C. R. Acad. Sci.*, vol. 235: pp. 1715-1717. 1952. Bacillus loses its toxicity to *B. mori* in alkaline culture medium. [P. B.]

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Troníček, Edvard, "K společenstvu *Solenobietum triquetrellæ-Bacotia sepium* Tčk. a k ekologii *B. sepium* Spr. (Psychidæ)" [in Czech, English & Russian summaries]. *Acta. Ent. Mus. Nat. Pragæ*, vol. 28: pp. 181-184. 1953. Describes the locality of some spp. of Psychidæ and gives information on the biology of *B. sepium* in Bohemia. [J. M.]

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Troníček, Edvard, "On the duration of the egg instar in butterflies" [in Czech, Russian & English summaries]. *Acta Soc. Ent. Čechosloveniæ*, vol. 50: pp. 29-52. 20 Jan. 1954. The duration of the egg stage in 280 spp. of Czechoslovak Lepidoptera, not hibernating in the egg stage. [J. M.]

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Ukhalin, M. M., & V. V. Strokov, "*Zeuzera pyrina* L." [in Russian]. *Les i Step'*, vol. 3, no. 12: pp. 83-84. Dec. 1951. [Not seen.]

Usinger, R. L., & Ira La Rivers, "The insect life of Arno." *Atoll Res. Bull.*, no. 15: 28 pp. 30 April 1953. Records, from this atoll in the Marshalls, *Achæa* sp. on *Scævola, Utetheisa* sp. on *Messerschmidia,* and *Hypolimnas* sp. on *Sida.* [P. B.]

Vainshtein, B. A., "Change in the population of wood-damaging insects under the influence of factors of forest ecology" [in Russian]. *Dokl. Acad. Nauk SSSR*, vol. 70: pp. 515-518. 1950.

Vainshtein, B. A., "The ecology of the Gypsy Moth" [in Russian]. *Zool. Zhurn.*, vol. 30: pp. 238-242. [Not seen.]

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Vanderplanck, F. L., "Causes of coconut nutfall and gumosis." *Nature*, vol. 172: pp. 315-316. 15 Aug. 1953. Reports *Lamoria* sp. feeding in bases of young coconuts. [P. B.]

Vereschagina, V. V., "The role of light in the behavior and distribution of the Gypsy Moth and the Oak Leaf Roller in the conditions of forest shelter belts" [in Russian]. *Zool. Zhurn.*, vol. 31: pp. 25-32. 1952. [Not seen.]

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Vergeer, Teunis, "The Cherry Fruitworm (*Grapholitha packardi*) as a blueberry pest in Michigan." *Quart. Bull. Mich. Agr. Exp. Sta.*, vol. 36: pp. 370-373. May 1954. Biology and control.

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Viktorov, G. A., "Parasites of the Acacia Pyralid (*Etiella zinkenella* Tor.) in the Stalingrad region" [in Russian]. *Zool. Zhurn.*, vol. 30: pp. 385-390. 1951. [Not seen.]

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Vlach, Vilem, "Contribution to the knowledge of the ecology of *Coleophora linosyris* Hering" [in Czech, English summary]. *Folia Ent.*, vol. 12: pp. 26-27. 1949. Describes the life history. [J. M.]

Vorontsov, A. I., "Dermestid beetles as destroyers of the Gypsy Moth" [in Russian]. *Zool. Zhurn.*, vol. 29: pp.406-416. 1950. [Not seen].

Voss, Edward G., "Butterflies and crab spiders." *Lepid. News*, vol. 7: p. 54. 29 July 1953.

Vrydagh, J. M., "Les principaux ravageurs des cotonniers dans le nord du Congo belge" [in French, Flemish summary]. *Bull. Agric. Congo Belge*, vol. 43: pp. 839-868, 19 figs. Sept. 1952. Describes biology and lists parasites of *Gelechia gossypiella* and *Sylepta derogata* in northern Belgian Congo; both feed on *Hibiscus* as well as cotton. [P. B.]

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NOTICES

Lepidopterists' Society members may use this page free of charge to advertise their offerings and needs in Lepidoptera. The Editors reserve the right to rewrite notices for clarity or to reject unsuitable notices. We cannot guarantee any notices but expect all to be *bona fide.*

Have several thousand European butterflies and moths, papered, named, with full data, about 300 different species, for exchange against butterflies from the Americas, Asia, Australia or Africa. Will help build up representative coll. of European Lepidoptera. T. W. Langer, Royal Library, Copenhagen, DENMARK.

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WANTED: literature (published or unpublished) or letters on exotic tropical Rhopalocera from Brazil, Mexico, India, Formosa, India and Africa. Especially interested in life histories, food plants, habits, collecting, and breeding. Will purchase. L. F. Vogel, 61 Berkshire Rd., Needham 92, Mass., U. S. A.

For sale: Lepidoptera and other insects of the Yucatan Peninsula. Special attention given to specialists with certain groups. All correspondence welcomed. E. C. Welling, La Casa Victoria, Chichén Itzá, Yucatan, MEXICO.

Morpho hecuba, M. menelaus, and many other Brazilian butterflies for sale, 1955 catch. carefully papered with full data, good quality. Jorge Kesselring, Caixa postal 6, João Pessoa (Paraíba), BRASIL.

Wanted: literature (taxonomic and faunistic) on neotropical Rhopalocera; also material of Lycænidæ, Riodinidæ, Satyridæ and Nymphalidæ from Central America and the Antilles. Offer for exchange original material, undetermined, with exact data, from other groups (Coleoptera, Odonata, Heterocera) from Brazil. Dr. Heinz Ebert, Geologist, Rua Santo Amaro 342, Rio de Janeiro, BRAZIL.

NOMINATIONS FOR 1956 OFFICERS FOR LEPIDOPTERISTS' SOCIETY

The Nominating Committee (A. E. TREAT, J. B. ZIEGLER, and F. H. RINDGE, Chairman) has presented the following list of nominees for 1956 officers:

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1st Vice President — JOHN A. COMSTOCK, U. S. A.

Vice Presidents — GEORGE WARNECKE, Germany, and LASZLO GOZMÁNY, Hungary

Executive Council (3 year terms) — G. VAN SON, South Africa, and D. C. FERGUSON, Canada

The terms of the present Secretary and Treasurer have two more years to run. Ballots will be distributed by the Secretary to all Society members in good standing.

The Executive Council has nominated for election to Honorary Membership E. MARTIN HERING. Prof. Dr. HERING, of the Zoologisches Museum in Berlin, Germany, is a distinguished taxonomist and is perhaps most widely known for his authorship of various sections of Seitz's *Macrolepidoptera of the World*, for *Biologie der Schmetterlinge* (1926), and for his volumes on leaf-mining insects.

The Executive Council has fixed the place for the 1955 annual meeting as the Archbold Biological Station, Lake Placid, Florida, and the time as late December. Notices giving the details of arrangements for the meeting are being sent to all North American and Antillean members.

ADDITIONS TO THE MEMBERSHIP LIST

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White, Galen (Rev.), Fisherman's Methodist Church, 226 Bay 35th St., Brooklyn 14, N. Y., U. S. A.
Wilson, Patrick, 434 Webster St., San Francisco, Calif., U. S. A.
Wiltshire, E. P., c/o Records Section, Foreign Office, 8 Carlton House Terrace, London S. W. 1, ENGLAND [Add to mailing envelope: Personal—Please Forward].

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and *ex-officio:* the above officers and the Editor-in-Chief

The object of The Lepidopterists' Society, which was formed in May, 1947, and formally constituted in December, 1950, is "to promote the science of lepidopterology in all its branches, ... to issue a periodical and other publications on Lepidoptera; to facilitate the exchange of specimens and ideas by both the professional worker and the amateur in the field; to secure cooperation in all measures" directed toward these aims (*Constitution,* Art. II). A special goal is to encourage free interchange among the lepidopterists of all countries.

Membership in the Society is open to all persons interested in any aspect of lepidopterology. All members in good standing receive *The Lepidopterists' News.* Institutions may subscribe to the publications but may not become members. Prospective members should send to the Treasurer the full dues for the current year, together with their full name, address, and special lepidopterological interests. All other correspondence concerning membership and general Society business should be addressed to the Secretary. Remittances in dollars should be made payable to: *The Lepidopterists' Society.* There are three paying classes of membership:

Active Members - annual dues $4.00 (U. S. A.)
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Each year a list of members of the Society is published in the *News,* with addresses and special interests. There are six numbers in each volume of the *News.*

All members are expected to vote for officers when mail ballots are distributed by the Secretary each year.

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PHYLOGENY OF BISTONINÆ
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ANNUAL LIST OF MEMBERS

(Complete contents on back cover)

16 April 1956

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Contributions to *The Lepidopterists' News* may be on any aspect of the study and collection of Lepidoptera in any part of the world. Particularly solicited are: 1) review papers on subjects of general interest to lepidopterists (*e.g.*, wing venation, mimicry, moth traps); 2) papers on such subjects as pre-adult stages, genetics, behavior, and comparative taxonomy (descriptions of new species and subspecies will be accepted); 3) field notes of more than a very local nature; 4) notes on well-tested techniques. Papers of more than ten pages will not normally be accepted.

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ITINERARIES OF THE WHEELER SURVEY NATURALISTS 1871—THEODORE L. MEAD

by F. MARTIN BROWN

The early naturalists who collected material in the western part of North America during the nineteenth century have long been a favorite subject for research with me. As our knowledge of the natural history of this vast area increases, it is becoming more and more imperative that we know just where they traveled and where the specimens that later became types were originally found. In 1936 I published a short account of the butterflies that WILLIAM H. EDWARDS described as new among those collected by THEODORE L. MEAD in Colorado. Since then I have dug deeper into MEAD'S stay in Colorado and now can supply a brief biography of him and a reasonably accurate account of his Colorado itinerary.

THEODORE MEAD was born to an old American family. His father's forebears arrived from England in 1642 and his mother's from France in 1685. MEAD was born in Fishkill, New York, in the Catskill Mountain region, on February 23, 1852. As a lad he traveled widely with his parents. He showed an early interest in natural history, particularly butterflies, that led him to WILLIAM H. EDWARDS, whose son-in-law he later became. In 1867 he entered the Sub-Freshman class at the College of the City of New York and later attended the College itself.

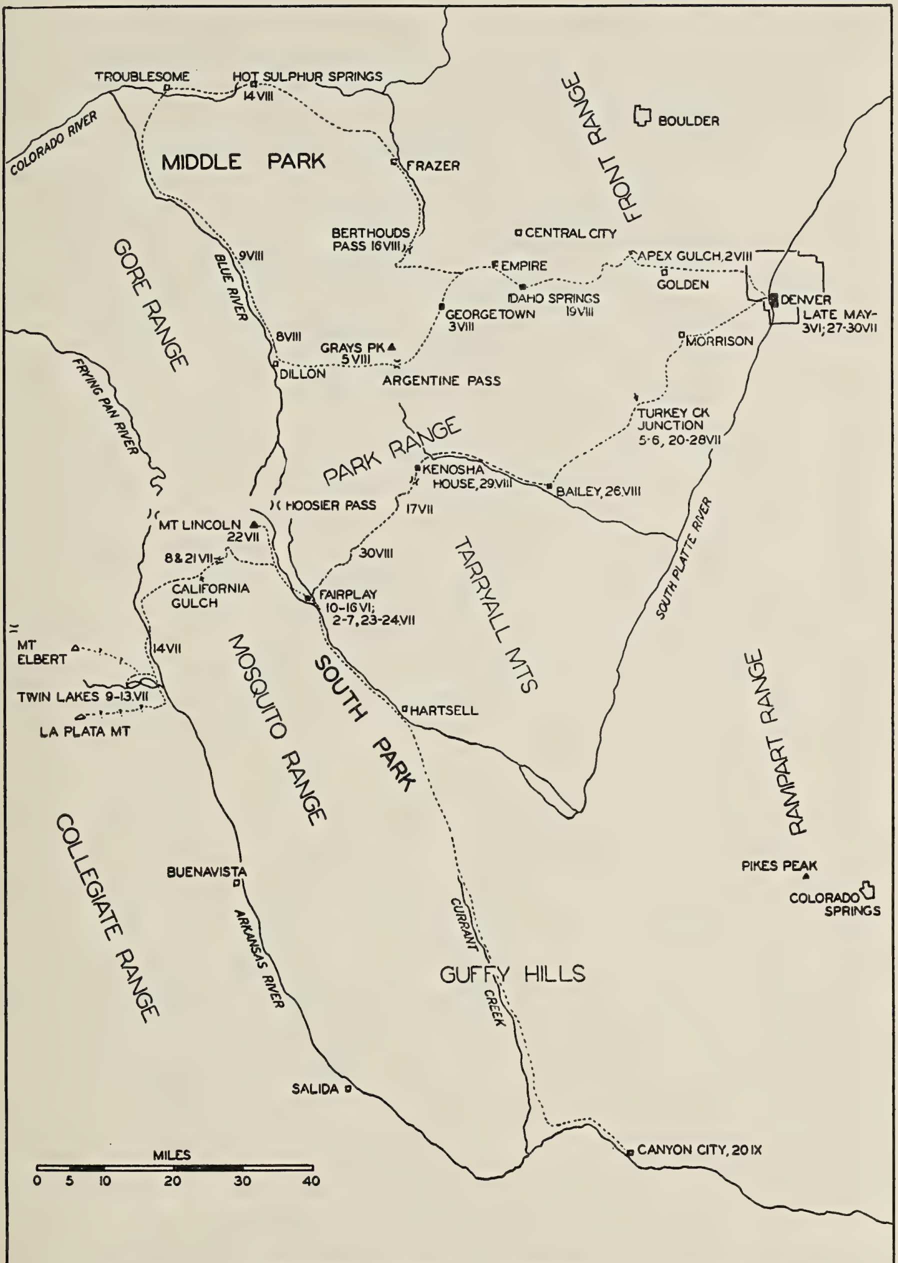
In 1868 he was elected to the American Entomological Society. The following summer he spent in West Virginia with EDWARDS. Apparently the boy's enthusiasm and ability attracted the great man to him, for in 1871 EDWARDS arranged that MEAD accompany the Wheeler Expedition to Colorado as a paying member. Mr. EDWARDS shared MEAD'S expenses for this trip and also shared in the catch. From Colorado MEAD continued westward in the fall and visited entomologists in California. He returned by steamer via Panama, where he collected butterflies, other insects, orchids, and "a live Iguana or two." The records of Cornell University show that he entered in 1871 and graduated in 1874. MEAD, however, stated that he entered Cornell in 1874 and received a "first degree in Civil Engineering" in 1877 and "the full degree as Civil Engineer in 1890". It is probable that MEAD refers to his graduate studies and the University records to his undergraduate work.

APR 2 5 1956

In 1877 he sold his collection of butterflies to the Carnegie Museum at Pittsburgh. From that time on, his life was devoted more and more to botanical and horticultural work. Today part of his great orchid collection is housed at Mead Park in Winter Park, Florida. 1878 saw Mead again heading for California with permission of his parents to stop over one steamer in Panama to collect. On the same trip he spent a few days collecting in mid-April at Acapulco, Mexico. He arrived in San Francisco in early May, leaving there on the 7th for Los Angeles and the San Gabriel valley. On this Californian trip, Mead visited the Mojave Desert, Yosemite Valley, Big Trees, Mariposa, Summit Station (on Donner Pass), Lake Tahoe, and Freel's and Talloc Peaks, the last being where he collected the types of *Œneis ivallda* Mead. Heading home, he further collected at Virginia City, Nevada, Cottonwood Canyon, Utah, Salt Lake City, and Green River, Wyoming.

In 1881 Mead, Henry Edwards, and A. R. Grote started the journal *PAPILIO.* The next year Mead married the daughter of William H. Edwards, and after a honeymoon in England he settled in Eustis, Florida, to try his hand at orange-growing. From this time on, Mead's interest in butterflies definitely waned and his love of things botanical steadily increased. He died in Winter Park, Florida, in 1936, shortly after publishing his autobiography (Mead, 1935).

With this brief sketch of Mead's life let me turn to the details of his stay in Colorado during the collecting season of 1871. In his autobiography Mead dismisses this important trip in four lines! Mead and his brother, S. H. Mead, Jr. (Mead, 1875, p. 786), a student at the School of Mines of Columbia University, arrived late in May at Denver, Colorado, a rendezvous for the Wheeler Expedition of 1871. At this time Denver was a small frontier city on the banks of the South Platte River some miles east of the mountains. Here rails ended. Travel to the west into and through the mountains was by foot, on horseback, and over a few stagecoach routes. Mead's objective was South Park. Two routes were open from Denver. One way was to use Mount Vernon Canyon to gain the summit of the plateau and then swing southward and westward over a toll road into South Park. The other was to go somewhat farther south on the plains and gain the plateau via Turkey Creek Canyon and follow the toll road to South Park. Mead followed the latter route. He left Denver [June 4?] and traveled to Morrison along an old road that now is followed in the main by Colorado highway 70. From Morrison his path took him southward to the mouth of Turkey Creek Canyon up which he went to the Junction House [June 5, 6]. This was a stage stop at the junction of the Turkey Creek and the toll road south from Bergen Park to the South Park area. Most of Mead's specimens from "Turkey Creek Junction" were collected between Junction House and Brownsville, about a mile south of the junction on the east side of the road. Southward from the Junction House the road winds through dry hilly pine forests on the high shoulders of the Front Range. At Bailey (Bailey's Ranch) it takes to the valley of the South Platte. Here Mead made later stays for collecting. From Bailey the present road goes westward along the south bank of the river. The old road traveled by Mead followed the north bank,



ITINERARY OF THEODORE L. MEAD IN COLORADO 1871

and traces of it can be seen on the slopes of the valley. He passed through the settlements of Fairville (across the river from Santa Maria), Grant, and Webster (then called Godfrey's). At Webster, in the mouth of Hall Valley, he started the abrupt climb to Kenosha Pass. Kenosha House, where he stayed, was just east of the present road, about a mile and a half north of Kino (a ghost town now) near the summit of the Pass. From the Pass he had his first vista of South Park, rimmed with towering peaks. The present route U. S. 285 is located on this old road from Grant westward. From the Pass it touches the town of Jefferson, skirts a mile south of Como, and goes into Fairplay. This was the terminus of the toll road in the northwestern corner of South Park. In Fairplay [June 10 -14] MEAD made his headquarters in the Berg House. The present Fairplay Hotel is a new (1926) structure on the same site. At Fairplay MEAD collected in the valley of Beaver Creek [June 12 - 14], just east of the town, and up the South Platte River in the broad glacial meadows.

MEAD found that he was too early for much collecting at Fairplay and retraced his steps to Junction House on Turkey Creek. He lingered at Kenosha House a day or so [June 15 - 17] and spent about a week at Turkey Creek Junction [June 20 - 27] before returning to Fairplay. I do not know preciesly when he arrived there the second time. He was at Kenosha House on June 29th, and the next firm date is July 6th at Fairplay. MEAD now continued westward. He crossed [July 8] Mosquito Pass on the trail to California Gulch and the headwaters of the Arkansas River and followed the river down to Twin Lakes, where he collected extensively [July 9 - 17]. MEAD collected on one of the high peaks that flank the present route to Independence Pass [July 10 - 11?]. From his scant descriptive notes I suspect that the rugged peak he climbed was La Plata Mountain. He retraced his steps and recrossed Mosquito Pass [July 21] to Alma or Fairplay and before returning to Denver climbed Mount Lincoln [July 22] via the Russia Mine road. It is interesting to note at this point that shortly after MEAD worked in this area, J. A. ALLEN from Harvard collected in the same region. Neither collector mentions the other in his accounts, however, so neither may have been aware of the other.

On his second sally from Denver, MEAD struck out in another direction and headed for Middle Park. His route followed Clear Creek from Golden into the mountains as far as Empire. His locality, Apex Gulch [Aug. 3], must not be confused with Apex in Gilpin County. The name is an old one for Chimney Gulch or one of its neighbors. MEAD says (1875, p. 773) that it is just within the foot-hills of the Rocky Mountains, and neither of the species he recorded from there, *Satyrus nephele* and *Thecla sæpium,* are high mountain species such as would be found at Apex. He must have made the trip from Denver to Georgetown by stage, probably "nooning" at Apex Gulch, for he arrived at his destination the same day, August 3.

From Georgetown he crossed the Continental Divide by means of Argentine Pass, visiting and collecting on Gray's Peak [Aug. 5] en route. From the pass he followed the Little Snake River through the mining camps of Decatur, Chihuahua, and Haywood to Dillon. There he picked up the Blue River [Aug. 8 -9] and worked his way along it to near its junction with the Grand River (now called the Colorado). This stretch was a lonely one with no mining-camps and no ranches at which to stay. Just before reaching the junction of the two rivers, he cut northeast through the hills to Troublesome on the Grand.

Once on the Grand River MEAD started back toward Denver. His track took him through Hot Sulphur Springs [Aug. 14] to 12-mile on Camp Creek where that stream breaks into a dozen or so streamlets. From there he went to Fraser and then up the north face of Berthoud Pass [Aug. 16] to gain again the Atlantic slope. His path from Berthoud Pass to Idaho Springs [Aug. 19] is the present location of route U. S. 40. From Idaho Springs he returned to Denver, probably by the same route he had used going west.

By now the season in the mountains was drawing to a close. MEAD again entered South Park via Turkey Creek, Bailey's Ranch [Aug. 26], and the toll road. This time, when he reached Fairplay, he turned his back upon the mountains and struck out across South Park by its long diagonal along the road that followed the west bank of the Middle Fork of the South Platte River to Hartsel. The present automobile road, Colorado 9, follows in the same direction but along the east side of the river. From Hartsel MEAD continued southward between Chalcedony and 39-mile Mountain along the Current Creek road to Canon City [Sept. 20]. This road follows in part the north rim of the Arkansas Gorge. The field party disbanded at Canon City at the close of September. MEAD returned to Denver and entrained for the West Coast.

The preceding itinerary is based upon intimate knowledge of the country, contemporary maps produced by the Hayden surveys of 1872-74, and dates given in MEAD'S account of the species collected by the Wheeler Survey and in various accounts found in W. H. EDWARDS' *Butterflies of North America.* The skeleton of dates upon which the meat of this story is hung follows with the species and sources; page references are to MEAD (1875) unless EDWARDS is specified:

June [1-3]—nr. Denver, *lyceas,* p. 785; *ridingsii,* p. 774.
June 5—Turkey Creek Junction, 7500 ft., *zephyrus,* p. 769.
June 6—Turkey Creek Junction, *meadi* p. 775; *weidemeyeri,* p. 770 (Note 1 below).
June 10—nr. Fairplay, *icelus,* p. 787.
June 12-14—Beaver Creek, *julia,* p. 748 (note 2).
June 12—Fairplay, 10,000 ft., *oleracea,* p. 744.
June 15—nr. South Park, *antiacis,* p. 784.
June 17—4 miles from South Park on South Park road, *ninus,* p. 778.
June 20—[Turkey Creek Junction], 7500 ft., *iole,* p. 747.
June 20-30—Turkey Creek Junction, *calydon,* p. 760.
June 23—Turkey Creek Junction, *heteronea,* p. 781; *rutilius* p. 787.
June 24—Turkey Creek Junction, 7500 ft., *satyrus,* p. 767; *weidemeyeri,* p. 770 (note 3).
June 29—Kenosha House, *triclaris,* p. 757.
July 6—Fairplay, *eurynome,* p. 755.
July 8—[Mosquito Pass], *meadii,* p. 750; *callias,* p. 775; *chryxus,* p. 777 (also Edwards, 1868-97, vol. I, *Parnassius* II-IV).
July 9—Twin Lakes, *charon,* p. 773.
July [10-11] [La Plata Peak?], *semidea,* p. 776; *centaurea,* p. 787.
July 12—Twin Lakes, *sirius,* p. 781.
July 13—Upper Twin Lake, *sirius,* p. 781.
July 14—Arkansas Valley, *triclaris.* p. 757.
July [15-20]—probably Twin Lakes until 17th, *arachne,* p. 761; ascent of La Plata or Elbert may have been made at this time instead of 10-11.

July 21—[Mosquito Pass], *callias,* p. 775.
July 22—Mt. Lincoln (Edwards, 1868-97, vol. I, *Parnassius* II-IV).
August [1-3]—Apex Gulch, *nephele,* p. 773.
August 3—nr. Apex Gulch, *sæpium,* p. 779.
August 3—Georgetown road, *melinus,* p. 778.
August 3—Georgetown, *berenice,* p. 750.
August 5—Gray's Peak, 12,000 ft., *chalcas,* p. 782; also en route to Middle Park (Edwards, 1868-97, vol. I, *Parnassius* II-IV).
August 8-9—Blue River, Middle Park (Edwards, 1868-97, vol. I, *Parnassius* II-IV).
August [6-13]—Middle Park, *myrina,* p. 756.
August 14—Hot [Sulphur] Springs, *bellona,* p. 756.
August 16—nr. Berthoud Pass, *hylas,* p. 768 (Edwards, 1868-97, vol. I, *Parnassius* II-IV).
August 19—Idaho Springs, *manitoba,* p. 789.
August 20—nr. Denver, *arachne,* p. 761.
August 26—Bailey's Ranch, *meadi,* p. 774.
August 28—20 miles from South Park on South Park Road, *hylas,* p. 768.
August 30—South Park Road, *manitoba,* p. 789.
September 10—South Park (Edwards, 1868-97, vol. II, *Colias* IV).
September 20—nr. Canon City, *halcyone,* p. 754.

Note 1: EDWARDS in vol. II, *Argynnis* 1 erroneously states Fairplay for this date.
Note 2: EDWARDS in vol. II, *Anthocharis* 3 erroneously gives the dates July 10-12 for the *julia* collected at Beaver Creek, Fairplay.
Note 3: EDWARDS in vol. II, *Argynnis* 2 erroneously gives the year as 1873.

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Edwards, William H., 1868-97. *Butterflies of North America,* 3 volumes.
Mead, Theodore L., 1875. *Reports of the Wheeler Survey,* vol. 5, *Zoology*: pp. 739-794, pls. xxxv-xxxix.
................, 1935. Theodore L. Mead—Naturalist, Entomologist, and Plantsman. An Autobiography. *Yearbook, American Amaryllis Society* vol. 2: pp. 11-22.

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SOME OBSERVATIONS ON THE HESPERIIDÆ OF THE ST. LOUIS AREA

by P. S. REMINGTON

Within a radius of 100 miles from St. Louis, Missouri, an area which the newspapers are fond of calling "The Forty-Ninth State", occur at least 41 species of Hesperiidæ, and it is possible that more may be discovered in the future. As recently as 1954 a first-capture record was established for one species. Some of these species are principally northern Skippers, some primarily southern, so that one explanation which has been suggested for this large number of species is the fact that St. Louis is located on what the ornithologists call the Mississippi Flyway. If this is a natural route of dispersion for birds, may it not be the same for insects? There are other species in our butterfly population besides Hesperiidæ which are truly southern in their range, such as *Eurema mexicana* Bdv. and *Phyciodes phaon* Edw., the former having been taken frequently in fresh condition within the city limits.

Of the forty-one species hereafter listed, 34 are definitely regular residents of this area and have been taken by collectors year after year, although far too little is known about their biology (food-plant, larval and pupal stages, etc.). We strongly suspect also that some species which we consider to be regular residents, such as *Hylephila phylæus,* do not winter here, but are regular immigrants, as *Danaus plexippus* Linné is known to be throughout the north. These points need to be determined by more intensive observation and study.

HAROLD I. O'BYRNE'S "Revised List of the Butterflies of St. Louis County" (Bulletin 3, 1941, of the Webster Groves Nature Study Society) has been useful in providing data regarding time of flight for many species. Dr. EDWIN P. MEINERS, dean of St. Louis collectors, has provided other useful data, and intensive collecting over a period of twenty years by the writer and his son, Dr. CHARLES L. REMINGTON, has given us the balance of our information.

One of the most interesting discoveries in this area was that of *Problema byssus* Edw. at Elsah, Jersey County, Illinois, in 1942. The type locality of this species is Indian River, Florida, and the description was made from a lot containing 13 males and 7 females. KLOTS, in his *Field Guide to the Butterflies* gives the range as "Florida to Texas and north to Kansas and Iowa." I find this same phrase for the range used by most authors since HOLLAND. However, FIELD in his "Manual of Kansas Butterflies" disposed of the "Kansas" part of the range. He wrote: "It was recorded for Kansas by Dr. SNOW in 1875 under the name of *Atrytone kumskaka,* Scudder (a synonym of *Pamphila byssus* Edw.). The Kansas specimen determined by Dr. SNOW as representing this species is in the Snow collection at the University of Kansas and is a female of *Atrytone logan* Edwards. There is something rather peculiar about this record of *A. kumskaka* Scudder by Dr. SNOW in 1875. This date is actually twelve years prior to the year that *kumskaka* was first described by S. H. SCUDDER as a new species, so that this name as listed by Dr. SNOW was probably an earlier manuscript name of SCUDDER'S and may or may not have been the species eventually described by SCUDDER in 1887. Whatever the name *kumskaka* may have been intended to represent at the time of the first date, SNOW'S specimen is *A. logan.*"

I was somewhat intrigued by this comment by FIELD and took occasion recently to hunt up the original description in the back files of the *Canadian Entomologist* in the Jones Library of Peabody Museum at Yale University. SCUDDER is altogether too vague in detail about this species. He does not tell how many specimens were in the type lot nor their exact locality. He mentions Iowa in one place and "Western states" in another, but no date of capture. He writes: "In connection herewith I have made two mistakes: First, in identifying in 1868 an Iowa species as *conspicua* and describing the proper male of *conspicua;* and second, the redescription, very briefly, of *pontiac* under the name

Hedone orono, being led astray by my supposition with regard to the Iowa butterfly. I have since given the Iowa butterfly, which belongs to *Atrytone,* the name *Kumskaka,* in naming it for others; but as this name has not been published, nor the species fully described, I append herewith a full description of the same."

One wonders, in considering the phrase "in naming it for others", used above, whether one of the "others" could have been Dr. SNOW. If so, SCUDDER had perhaps not yet made up his mind about the determination of his *kumskaka.* In the article containing the original description of *kumskaka,* SCUDDER gives a drawing of the male genitalia which agrees exactly with the figure of the male genitalia of *Problema byssus* given by LINDSEY, BELL, and WILLIAMS in "The Hesperioidea of North America". For this reason, present-day writers have thrown out *kumskaka* as a synonym of *byssus.*

In early July of 1942 I discovered *byssus* flying in fair quantity on the upland prairies along the bluffs of the Mississippi River on the campus of Principia College at Elsah, Illinois (about forty miles from St. Louis). It was found there again at the same point in the following year and later on June 18, 1949, in St. Louis County, so it is definitely a resident of this area. It was thought at first that perhaps we had re-discovered SCUDDER'S *kumskaka,* the true identity of which has puzzled students since its description in 1887. Dr. E. P. MEINERS made a genitalic study of our local *byssus* and reported that the genitalia agree exactly with the published figure of *byssus.* I now have a long series from Elsah and Florida and see no essential differences. The question arises, how did this species locate in the St. Louis area, where it is extremely local? Is this a product of the Mississippi Flyway or is it just another example of discontinuous distribution? Possibly collectors further south along the River may supply clues to the answer. In 1943 I confined a female *P. byssus* on the long grass which the species frequents, hoping that I might obtain eggs and raise a brood. She laid one egg which did not hatch.

An allied species which was first discovered by the writer in St. Louis County is *Atrytone dion* Edw., taken in the marshes around Creve Coeur Lake in June and July 1932. It has been found there year after year since 1932. One or two specimens were taken by Dr. C. L. REMINGTON within the city limits of St. Louis. Here again we have a thriving local colony with occasional strays.

Hesperia metea Scud. was an unexpected prize first turned up in 1935 at Cedar Hill in Jefferson County, Missouri. The first few specimens, two males and a female, were sent to the late AUSTIN H. CLARK at the Smithsonian Institution for identification. He reported that they were *Hesperia metea* and commented that the female was so dark that it might agree with the figure published by HOLLAND of the only known specimen of *H. horus* Edw., which was first described from Dallas, Texas. A few years later I was kindly permitted by NATHAN BANKS, then curator of insects at the Museum of Comparative Zoology at Harvard University, to examine the type and only known specimen of *horus* in the museum and to compare it with mine. They were not identical. However perhaps the puzzle of *horus* has been solved, for in *Entomological News* for October 1948, H. A. FREEMAN described a new race of *Hesperia metea* from Texas which he later considered to be *H. metea licinus* Edw. and stated that some of his females agreed closely with sketches of the type of *horus.* I have a long series of *H. metea* from Massachusetts, Georgia, and Missouri which show the species to be very variable. It flies here only in the early spring in wooded hilly areas. I took it again this year.

On September 6, 1954, Dr. C. L. REMINGTON collected in St. Louis County our latest addition to the local fauna—*Amblyscirtes belli* Freeman. While collecting at Kirkwood in a temperature about 115°F. he collected two females and a male of this species. In the field they were assumed to be a fall brood of *A. vialis,* which is common here, and little attention was paid to them. However, on being examined more closely later, it was seen to be *A. belli,* a new record for the area and the northernmost record known for the species. It evidently breeds in this densely wooded ravine along the Meramec River and either has escaped attention until now or is a new arrival. A single specimen was also found at this locality on September 3, 1955, by Dr. REMINGTON, this time on a thistle flower. It will be interesting to see whether it will be found there in future years.

Interesting cases of stray intrusions of southern species in this area may be cited. Perhaps the most extraordinary of these is *Timochares ruptifasciata* Ploetz, taken at Elsah, Illinois, on August 29, 1941, by CHARLES L. REMINGTON. A battered male was caught on an alfalfa flower. This is a Mexican species, considered merely a straggler into the United States except in southernmost Texas. Dr. A. W. LINDSEY checked the identification of the specimen. The surprising appearance of this exotic skipper here was preceded by several days of steady strong winds from the south. The Skipper must have been brought in on the winds.

Another southern visitor was a single specimen, quite fresh, of *Urbanus proteus* L. taken by Dr. E. P. MEINERS inside one of the buildings in Forest Park, St. Louis, on October 5, 1945. The insect had sought shelter there during the night. So far as we know, this is the only specimen ever taken here.

Calpodes ethlius Stoll was found in St. Louis by two of the old-time collectors, ERNST SCHWARTZ and AUGUST KNETZGER, in the fall of 1911. SCHWARTZ found several larvæ feeding on Canna on November 5; on being brought indoors, they pupated and emerged on November 20. A killing frost on November 6 probably exterminated any others in the vicinity, and we do not have any records of its capture since.

Another southern visitor, *Lerema accius* J. E. Smith, was taken at Cliff Cave, St. Louis County, on August 22, 1908 by C. L. HEINCK. No one has reported it since.

Autochton cellus Bdv. & Lec. has been taken by HERMAN SCHWARTZ in Perry County, Missouri, on July 20, 1919. This is less than 100 miles from St. Louis. I have seen this specimen which is now in Dr. MEINERS' collection. The species was again reported from the state by KILIAN ROEVER, who saw a single specimen at close range at Big Springs State Park in Carter County on June 14, 1952.

Brief notes on the other species of Hesperiidæ found in the St. Louis area follow.

Proteides clarus Cramer is one of our commonest Skippers, and its broods are not sharply definable. Fresh specimens are on the wing from the middle of April until the end of September, and larvæ in all stages of development are seen from mid-May to early November. Heaviest numbers have been observed in early May, early June, late August, and late September. Adults are attracted to the blossoms of Alfalfa, Privet, and Redbud. The foodplants are legumes.

Achalarus lyciades Geyer is common in sunny patches in the woods. The two broods observed are: (1) large numbers from the last week in May until the last week in June; (2) fewer in late August and early September.

Thorybes bathyllus J. E. Smith is not uncommon from late April through September. It is also found in woods. Dr. A. W. LINDSEY examined a specimen of this species in which the fringes were so white that *T. drusius,* a southwestern species, was indicated. A check of the genitalia, however, proved it to be *T. bathyllus.*

Thorybes pylades Scud. is less common than *T. bathyllus* and is found from April through July. It is often confused with the former species.

Pyrgus communis Grote is plentiful from April through November. It may be that a few specimens hibernate as adults, since worn specimens appear early in April. The first fresh specimens appear soon afterward, and this brood ends in mid-May. The summer brood is common throughout July. The heaviest period of flight for the year is from the middle of August until the middle of November, and at this time *P. communis* vies with *Colias eurytheme* Bdv. and *Phyciodes tharos* Drury for possession of the large clumps of Asters.

Pholisora catullus Fabr. is one of our commonst Skippers and flies from May through September.

Pholisora hayhurstii Edw., a usually uncommon species, has been found here in considerable numbers where open patches of bushes and trees have thick grass and weeds growing between the shrubs. Two broods are found here. The greater numbers fly from the middle of May until the middle of June, and a smaller brood appears late in August.

Seven species of *Erynnis* have been found in this area and their identity established by genitalic study.

Erynnis brizo Bdv. & Lec. is one of our earliest spring butterflies found on wooded hilltops from late March to early May. Some years it is quite plentiful.

Erynnis baptiseæ Forbes seems to be still very rare in this area, perhaps because few collectors can distinguish it. Four specimens were reported in April by O'BYRNE from St. Louis and three by the writer on August 12, 1942, near Grafton, Illinois.

Erynnis horatius Scud. & Burgess is limited to one brood apparently flying from May to September and is not uncommon in clover fields. One late record is for a fresh female taken on September 28, 1940.

Erynnis lucilius Scud. & Burgess is perhaps our rarest *Erynnis.* I have two specimens taken in early September at Glencoe, St. Louis County.

Erynnis juvenalis Fabr. is another strictly spring species found exactly sympatrically with *E. brizo,* but more common. It is easy to distinguish them.

Erynnis martialis Scud. may be taken not too uncommonly from late April to early August, generally in wooded areas.

Erynnis persius Scud. is found sparingly from late April to early July.

Ancyloxypha numitor Fabr. is common in moist meadows from May through September.

Hesperia leonardus Harris is a fall species here, regularly found in September in wooded areas. Missouri specimens seem to be larger and darker than eastern and northern specimens.

Hylephyla phylæus Drury is common from July through October and is often found in gardens in the city.

Atalopedes campestris Bdv. is easily found July through October, often in the city in company with the preceding species.

Polites peckius Kirby is not uncommon in fields from May through September.

Polites verna Edw. is not rare in fields near woods, from May through July.

Polites themistocles Latr. is one of our commonest Skippers from May through September, on lawns and grassy fields.

Polites manataaqua Scud. appears to be rare but probably is confused often with the last species. It flies June through September. A female sent to Dr. J. McDUNNOUGH was identified as this, and Dr. A. W. LINDSEY concurred on this identification.

Wallengrenia otho egeremet Scud. is a mid-summer Skipper here and can be found commonly on Ironweed (*Vernonia*) blossom June to September.

Poanes hobomok Harris is quite rare and very local. Females are never dark here. I have a nice series taken in May and June at Kirkwood, St. Louis County.

Poanes zabulon Bdv. & Lec. is very common May through September.

Atrytonopsis hianna Scud. has been taken at Cedar Hill, Jefferson County Missouri, and at Sullivan, Missouri, in April and May; it is not common.

Atrytone ruricola Bdv. is common here May to September.

Atrytone logan Edw. is not uncommon May through September.

Amblyscirtes vialis Edw. is quite common in wooded areas from April through August.

Amblyscirtes hegon Scud. is much less common than *A. vialis* and may be found in woods from April through September.

Lerodea l'herminieri Latr. is rather rare. We have specimens taken from late May through September.

Lerodea eufala Edw. is also uncommon and flies later, from August through November. My best catch was on Asters in Oak openings.

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A NEW SPECIES OF *HESPERIA* FROM CALIFORNIA (HESPERIIDÆ)

by H. A. FREEMAN

During 1953 Dr. J. W. TILDEN sent me some specimens of *Hesperia*, and among the group were several individuals of a species which appeared new to me. After carefully comparing these specimens with all the other known *Hesperia* from North America as to superficial characteristics and genitalia, I am convinced that they represent an undescribed species, as follows.

Hesperia tildeni new species

MALE (Upper Side): Primaries broadly yellow fulvous, fusing into the subapical spots and into the darker marginal border. There are two indistinct yellow fulvous extradiscal spots. The stigma is rather narrow, with only a few dark scales below it. Secondaries are yellow fulvous except for a narrow dark margin. Fringes are slightly darker than the yellow fulvous overscaling.

(Under Side): Primaries completely overscaled with light yellow scales. The dark margin is very indistinct as are the subapical and extradiscal spots. Secondaries are somewhat variable with most specimens having the overscaling light chestnut brown. Some are as dark as *H. dodgei* (Bell). The band of discal spots is very variable, ranging from entirely absent to well defined and is only slightly lighter in coloration than the ground color. The basal spots are of the same color and show less variation.

Thorax above is slightly darker than the wings at their base, lighter beneath. Abdomen is of the same yellow fulvous as the wings. Palpi are light tan beneath. Legs are light brown. Antennæ are brown with the outer edge of the club black.

Expanse of males, 22 to 29 mm., average 25 mm.

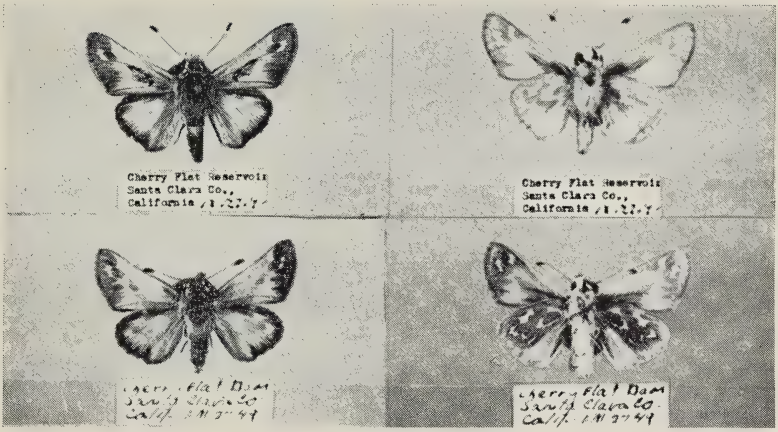
FEMALE. (Upper Side): Primaries are very similar to the males, except some have the marginal dark area extending inward a little more. The coloration and maculation are very similar to those of the males. Secondaries are variable, from immaculate with a narrow marginal border to fairly dark with the discal spots well defined. The general tendency is toward the obliteration of the discal spots by the yellow fulvous overscaling. Fringes are creamy, lighter than the overscaling over the central portion of the wings.

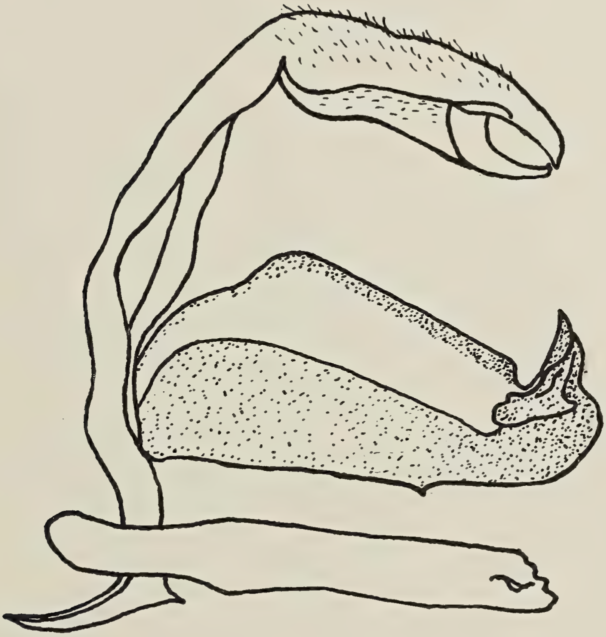
(Under Side): Primaries are similar to those of the male, except that the subapical and extradiscal spots are better defined. Secondaries have the ground color variable, from ochreous to dark chestnut brown; most specimens are chestnut. The discal band of spots is variable, ranging from a single spot near the apex to a well defined band of spots. The coloration of the discal band is from ochreous to creamy, being only slightly lighter than the ground color. Basal spots are of the same color.

Thorax above is slighter darker than the wings at their base, lighter beneath. Abdomen is of the same yellow fulvous as the wings. The palpi, legs, and antennæ are also like those in the males.

Expanse of females, 23 to 22 mm., average 26 mm.

Type material: HOLOTYPE male, Cherry Flat Reservoir, Santa Clara County, California (J. W. TILDEN), 27 August 1949; ALLOTYPE female, Cherry Flat Dam, same area, collector, and date as holotype; 36 male and 32 female PARATYPES from the following locations: Cherry Flat Reser-





Top row: *H. tildeni* HOLOTYPE ♂, Cherry Flat Reservoir, Santa Clara Co., Calif., Aug. 27, 1949 (J. W. TILDEN).

Middle row: *H. tildeni* ALLOTYPE ♀, Cherry Flat Dam, Santa Clara Co., Calif., Aug. 27, 1949 (J. W. TILDEN).

Bottom: Male genitalia of *H. tildeni*. Cherry Flat Reservoir, Santa Clara Co., Calif., Sept. 27, 1949. Slide No. H100.

voir, one male, 27 September 1949, 10 males and two females, 27 August 1949; Cherry Flat Dam, eight females, 27 August 1949; Arroyo Bayo, 17 males and eight females, 8-17 September 1953; Mount Hamilton, one male, 30 May 1949, one male, 6 August 1949, four males and 10 females, 17 September 1953; Alum Rock Park, one male, 20 August 1950, and two females, 7 September 1951; Isabel Creek, Mount Hamilton, one female, 17 July 1952; Saritoga, one female, 7 September 1943 (T. B. BLEVINS), all in Santa Clara County; Mocho Canyon, Alamida County, one male, 30 August 1949.

Holotype and allotype are in the American Museum of Natural History. Paratypes will be deposited in the following collections: 10 pairs, J. W. TILDEN; two pairs, STALLINGS and TURNER, Caldwell, Kansas, two pairs, Los Angeles County Museum; two pairs, Yale University; one pair, Chicago Museum of Natural History; and remaining paratypes are in the collection of the author.

This previously undescribed species is named for Dr. J. W. TILDEN who collected most of the specimens in the type series.

On the upper side this species slightly resembles small specimens of *Hesperia lindseyi* (Holland) because of its washed out appearance due to the indistinct maculation and somewhat darker outer margin; however, on the lower side there is no resemblance between the two, especially on the secondaries, where *H. lindseyi* has a well defined and rather broad type of maculation on a light ground color, while the maculation of *H. tildeni* is reduced and the ground color is dark. The females show some similarities to *Hesperia dodgei* (Bell) on the lower side of the secondaries, as both have the chestnut brown ground color; however, the coloration is darker in *H. dodgei.* On the under side of the secondaries the general maculation in both sexes also somewhat resembles that of *dodgei,* in that both species have the same generally reduced maculation and the spots are in the same areas. On the upper side of the males some of the specimens slightly resemble *H. harpalus* Edwards; however, they lack the brassy sheen which is present in that species. *Hesperia tildeni* may be distinguished from all other North American species of the genus by the following combination of characters: (1) size — this is the smallest species in the genus; (2) the generally washed out appearance on the upper side, with a rather dark marginal border; (3) the generally dark ground color on the under side of the secondaries; (4) the reduced maculation, which varies with some specimens.

The male genitalia of *tildeni* are different from those of any of the known *Hesperia.* The uncus is somewhat similar to that structure in *dodgei;* however the claspers are different in three respects: (1) there is a deep excavation on the dorsal side just posterior to the proximal and distal teeth; (2) the teeth are close together and one-fourth longer than those of *dodgei;* and (3) the base of the distal tooth is unevenly curved on the posterior side, while in *dodgei* it is evenly curved abruptly downward.

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ON THE PHYLOGENETIC RELATIONS IN THE BISTONINÆ (GEOMETRIDÆ), WITH SPECIAL REGARD TO *PŒCILOPSIS*

by DALIBOR POVOLNY and JOSEF NOSEK

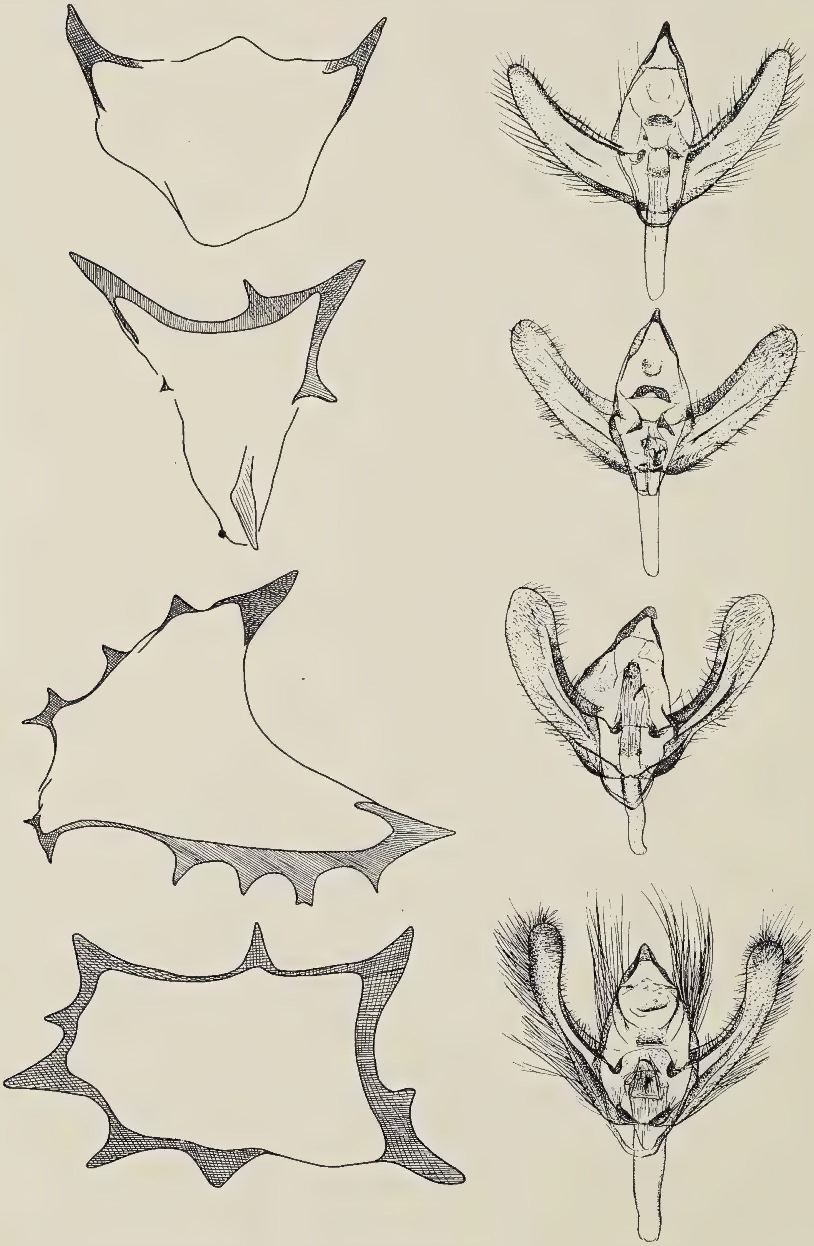
In our recent work (Povolný & Nosek, 1954) we tried to illustrate the position of *Pœcilopsis isabellæ* Harrison and its zoogeographic character. This was possible only in simultaneous comparison of several groups of the geometrid subfamily Bistoninæ, which resulted in some important viewpoints on the phylogenetical relations of this group. To illustrate them with special regard to the genus *Pœcilopsis* Harrison is the theme of this study. It is an agreeable duty to thank Dr. T. N. FREEMAN for providing us the single non-European species of *Pœcilopsis*—*P. rachelæ* Hulst—which we could not obtain in European institutions and for his very kind help in our work.

HARRISON was the first author pointing to the great heterogeny of the old genus *Biston* Leach, towards the beginning of this century. In 1915 PROUT (in Seitz) gave a more progressive systematical conception of the Bistoninæ, if we compare it with that one of the older authors (STAUDINGER, SPULER, and others), though he does not include *P. isabellæ.* This conception by PROUT was based mostly upon external morphology (venation, legs and their spines, palpi, proboscis, etc.), and in limited dimension also upon anatomical criteria, though Pierce has in 1914 already published a good analysis of the genitalia of the British Bistoninæ. Pointing to the work mainly of HARRISON, PIERCE, and of other authors, similarly as to our own study, we do not intend to give once more a detailed morphological description of the single species, but we shall instead discuss the known facts from the viewpoint of phylogeny.

It is evident that the present Bistoninæ consist substantially of two large groups of genera and species. The first group contains older and mostly isolated species and genera. They all have a bifurcated ending of the uncus and mostly differentiated male genitalia. Two branches can be distinguished in this group. The first contains the forms related to *Biston strataria* Hfn. and *Amphidasis betularia* L., the second being certainly congeneric with the first. It seems very probable that these are simultaneously the forms connecting the Bistoninæ with the Ennominæ (through *Gonodontis*), as indicated in 1913. This is shown in the presence of the wings in both sexes, and in the ecology, as *Biston* appear much later than other Bistoninæ, which appear mostly in the early spring. The other branch of the first group is represented by genera and species such as *Phigalia* (*pedaria* F.), *Macrobiston,* and *Apocheima* (*hispidaria* Schiff.). These belong to the true Bistoninæ and represent their older forms.

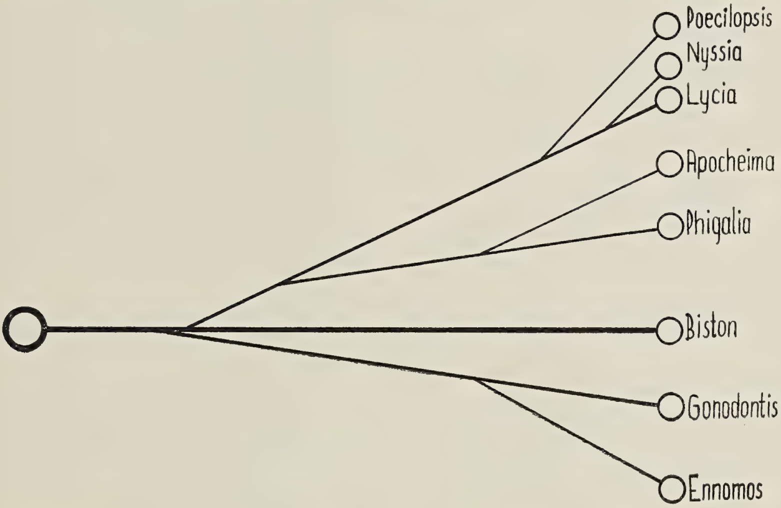
The second group is represented by the relatively very homogeneous forms of monophyletic origin, which must be also much younger than the first group. This is shown in their surprising morphological uniformity and simple genitalia. These forms are concentrated in three genera representing the single branches of development of this group. These genera are *Lycia* Hbn., *Nyssia* Dup. (*Ithysia* Hbn.) and *Pœcilopsis,* of which many forms are of strictly European origin. The close relation of this group is shown not only in morphology but also genetically, because most species tend to rich hybridization.

In contrast to the first group, whose members are distributed on the enormous Palearctic area and penetrate also northern America, the distribution of many members of the second group is more limited, and some are strictly European.



Top, *P. lapponaria;* second, *P. pomonaria;* third, *P. isabellæ;* bottom, *P. rachelæ.* (Female *signum bursæ* left; male genitalia right.)

Ecologically the two groups also differ greatly. Whereas members of the first group feed only on trees, those of the second are in their majority adapted to herbaceous plants. The first group are, indeed, forest-forms; in the second group inhabitants of prairies prevail. The oldest forms of the second group are contained in the genus *Lycia* (*hirtaria* and *ursaria*) representing the surviving branch of the primitive early Bistoninæ. The second two branches (*Nyssia* and *Pœcilopsis*) are the youngest genera of the Bistoninæ. HARRISON (1913) considered *Pœcilopsis* younger than *Nyssia*, but it is very difficult to decide exactly the relative age of these two groups. Much more, it seems that they are both young, independent parallel branches of the Bistoninæ.



The species of *Nyssia* are decided inhabitants of herbaceous growth and centered in central Europe, whereas *Lycia* and *Biston* (*s. str.*) are of Siberian origin. HARRISON (1913) considered *Nyssia zonaria* Schiff. the most specialized *Nyssia*. It is to point, however, that this species has a wider distribution than all other *Nyssia* and is rather polyphagous. The circumstances show that *N. zonaria* is an eurytopic species, whereas the other *Nyssia* are specialised stenotopic forms of the Alps and of the mountains of the Balkans. Some of them are *in statu nascendi*, representing plastic and recently originating forms.

Pœcilopsis contains four species (*pomonaria* Hbn., *isabellæ*, *lapponaria* Boisd., and *rachelæ*), *P. pomonaria* being original and comparatively isolated. Morphologically the species are very close, but evidently *P. pomonaria* is closely related to *P. isabellæ*, whereas *P. lapponaria* and *P. rachelæ* are in development. In contrast to *Nyssia*, which are oligophagous, *Pœcilopsis* are substantially polyphagous forms inhabiting various trees of forests and plants in the boreal prairies. Though we can see the tendency to foodplant specialization in some of them, it is evident that they must have been polyphagous, as most of them they can be reared on *Betula*, *Cratægus*, *Salix*, etc. The broadest polyphagy is seen in *P. pomonaria*, feeding mostly various forest trees (*Quercus*, *Cratægus*, but also *Malus,* etc.), whereas *P. isabellæ* is specialised on *Larix. P. lapponaria* feeds on various herbs (*Erica, Calluna*), but also trees (*Betula, Cratægus*), and about *P. rachelæ* HARRISON writes that this species "has a similar weakness for dwarf willows on the prairies". It seems that *P. pomonaria* is the derivate of the ancestral *Pœcilopsis*-form living in the Eurasiatic forest-zone of mild climate. The specialization of these forms in the European region on the deciduous conifer *Larix* produced *P. isabellæ.* The populations of the boreal forests developed to *P. lapponaria* in Europe and to *P. rachelæ* in northern America.

Some authors have presumed that *P. lapponaria* and *P. isabellæ* in Europe are of boreoalpine history and of postglacial origin. Respecting not the fact that *P. isabellæ* Harr. is related more with *P. pomonaria* Hbn. than with *P. lapponaria* Boisd., we see further convincing facts showing the contrary. BEIRNE (1947) proved that even much longer periods than Holocene (about 20,000 years) were not sufficient for developing species by the isolation of *P. lapponaria* and *Nyssia zonaria* in the British Isles, where the presence of *P. lapponaria* is from the first würm-stadial (120,000 years) and of *N. zonaria* from the first würm-interstadial age (80,000 years), building races differing little from the continental populations. *P. isabellæ* is closely dependent upon the European *Larix,* which has nothing to do with the European glacial-period, and their histories are in common. *P. isabellæ* was carried beyond the original area of the European *Larix* by the activity of the man, and in certain secondary habitats it may cause great damage on its foodplant. It is to be decided, finally, what route brought *P. rachelæ* to its present native country. The close relationship between *P. lapponaria* and *P. rachelæ,* and the present known distribution of *P. lapponaria* suggest the possible historical connection through the presumed continental bridge of Iceland and the present islands of the northern Atlantic. However, the eastern distribution of *P. lapponaria* and its limits in Europe or Asia, and the western distribution of *P. rachelæ* in Canada are not known.

It is to be concluded that Bistoninæ are of Angarian origin. The differenciation of the first group (*Biston, Phigalia, Apocheima*) must have been finished in the upper Pliocene there. Towards its end the mighty stream of the Angarian fauna was drawn westwards by the climatic changes of the starting glacial and in the European region the specialization and development of the Bistoninæ was continued in the Pleistocene by the origin of *Nyssia* and *Pœcilopsis.* The first of them developed by specialisation to the herbaceous vegetation in the Alps and Balkans. The second originated in the forests of central and northern Europe. The origin and distribution of *Pœcilopsis rachelæ* requires further study.

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ESPECIALLY FOR FIELD COLLECTORS

(Under the supervision of JAMES R. MERRITT)

EDITORIAL NOTE

In the last issue of the *News* an editorial announcement outlined the plans of the committee to promote a special section of the *News* for field collectors. In response I received a number of provocative and thoughtful letters for which the committee is grateful. These letters contained a multitude of excellent suggestions which eventually will be reflected on these pages. It is a pleasure also to report the generous way in which the expert lepidopterists replied to pleas for articles.

In this issue appears the first one of a series of articles on collecting localities. Some of the localities are famous and others are comparatively unknown. To achieve as much variety as possible in these articles and to exploit the imagination and ingenuity of the authors, no form or content was prescribed for the locality series. Some of the articles are in the nature of collecting guides while others deal with geology, flora, climate, and lists of species. Because the spring collecting season begins earliest in the South, it is appropriate to start the series with an account of collecting in southern Florida.

The committee contemplates some commentaries on techniques both basic and unusual. Drs. C. A. CLARKE and P. M. SHEPPARD were kind enough to prepare a paper describing in some detail the important hand-pairing technique. This article will appear soon in the *News*.

WILLIAM E. SIEKER of Wisconsin, who specializes in the Sphingidæ, has agreed to join the committee for this section of the *News*.

JAMES R. MERRITT, University of Louisville, Louisville, Ky., U. S. A.

ONE DAY'S SPECIES IN THE FRENCH ALPS

Even if my results do not reach the same number (38) of butterfly species caught in one day by Dr. REMINGTON, partly because I had only occasion to collect during short intervals in the course of an automobile trip in the French Alps, I think it might interest American lepidopterists to know how many butterfly species may be taken in a single day in Europe.

The day was not precisely the best collecting day of the season, being June 30, 1955, and in Europe as in the United States mid-July is by far the best time of the year. The district was the Massif de la Grande Chartreuse which is located between Geneva in Switzerland and Grenoble in Eastern France, a genuine mountain locality densely grown with deciduous forests with numerous clearings where grass and flowers are found in profusion. The trip was not very long, some 15 miles in either direction, so that the territory covered was rather limited.

The species taken were the following:

PAPILIONIDÆ. — *Parnassius apollo,* comm.

PIERIDÆ. — *Aporia cratægi,* v. comm.; *Leptidea sinapis,* rare.

SATYRIDÆ. — *Erebia œme,* r. comm.; *Melanargia galathea,* v. comm.; *Hipparchia fagi,* rare; *Brintesia circe,* comm.; *Aphantopus hyperanthus,* comm.; *Lopinga achine,* comm.; *Maniola jurtina,* comm.; *Cœnonympha arcania,* comm.; *C. pamphilus,* v. comm.

NYMPHALIDÆ. — *Aglais urticæ,* r. comm.; *Inachis io,* 1 spec.; *Melitæa diamina,* comm.; *M. britomartis,* rather rare; *M. athalia,* comm.; *M. parthenoides,* not rare; *M. phœbe,* a few; *M. didyma,* r. comm.; *Mesoacidalia charlotta,* comm.

LYCÆNIDÆ. — *Strymon ilicis,* r. comm.; *Palæochrysophanus hippothoe,* v. comm.; *Heodes virgaureæ,* 1 spec.; *Cupido minimus,* a few; *C. sebrus,* a few; *Aricia agestis,* comm.; *Eumedonia chiron,* a few; *Cyaniris semiargus,* r. comm.; *Polyommatus icarus,* v. comm.; *Lysandra escheri,* 1 spec.; *L. bellargus,* r. comm.; *L. argester,* 1 spec.

HESPERIIDÆ. — *Adopæa lineola,* r. comm.; *A. silvester,* comm.; *Thymelicus actæon,* comm.; *Ochlodes venata,* comm.

The total number of species is 37, but the day before I found at nearly the same place another 4 species:

Dira mæra, several; *Pieris rapæ,* 1 spec.; *Melitæa deione,* 1 spec.; *Cœnonympha tullia,* many.

A thorough search of the territory, including the tops of the mountains, could not have failed to reveal another half a dozen species which are bound to high altitudes.

T. W. LANGER, Royal Library, Copenhagen, DENMARK

NOTES ON COLLECTING LEPIDOPTERA IN SOUTHERN FLORIDA[1]

by FRANK N. YOUNG

If you are planning a collecting trip to Florida try to travel by automobile if you possibly can. Stop off at Merritt's Island and explore the pine flatwoods and sandy barrens along the way. The northern area of the state produces many interesting insects. The rare *Atrytone berryi* is found in the pine flatwoods, and *Megaythymus cofaqui* sometimes hovers about clumps of yucca (March-April).

At Fort Myers, Okeechobee, or West Palm Beach the Sabalian Biotic District, which covers most of northern Florida, blends with the subtropical region. The characteristic cabbage palms, saw palmettos, and live oaks give way in part to trees, shrubs, grasses, and herbs of more tropical affinities. Many Florida species never even stray as far north as the Ohio; but in the subtropical areas species after species traces back to the Neotropics, and it seems that collectors are turning up new records for the United States every day.

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[1] These notes are intended primarily for the use of the amateur, not the professional entomologist. It is assumed that A. B. KLOTS' invaluable *Field Guide to the Butterflies* will be available, and it is suggested that road maps be supplemented with county maps in areas where you plan to collect intensively. Excellent county maps can be obtained from the State Highway Commission, Tallahassee, Florida, or at various surveyors' offices in the larger towns. See the appendix for notes on camping, poisonous snakes, mosquitoes, etc.

The subtropical region in Florida is variously delimited by different authorities. Some place its northern edge as far north as the valley of the Kissimmee River. Others mark it more conservatively as south of a line extending from about Naples to southern Palm Beach County. None of this area, except the lower Florida Keys, is frost free, but the coastal districts approach tropical conditions during most of the year. The best time for collecting, in my experience, is from April through August. May, June, and July are probably the best months. True, some hardy species, such as *Heliconius charitonius,* overwinter, but even they are gradually depleted by cold and drought. December, January, and February are generally poor, although you will probably find something of interest on the wing throughout the year. It is hard to find a time when every possible species will be flying, but you should find from 25 to 50 interesting butterflies in a two-week period during any of the spring or summer months.

THE NORTHERN AND CENTRAL EVERGLADES: If you drive down U. S. Highway 1 you will not only be in the most thickly populated part of south Florida, but will miss the Everglades entirely. Therefore, I suggest that you take either U. S. 27 or U. S. 41. On either of these routes you will pass through portions of the true Everglades still in nearly natural condition.

U. S. 27 crosses the northern Everglades between Belle Glade and Miami. Here the sawgrass marsh is the principal vegetational type, and you will find the best collecting along the edges of the road or on the limestone spoil banks of the canals. The latter are often grown up with dense stands of the white flowered Spanish Needle (*Bidens leucantha*) and seem to concentrate large numbers of skippers and other butterflies. The wild figs which line the canals attract *Marpesia petreus thetys,* and the edges of the canals may produce numbers of *Anartia jathrophæ guantanamo* whose larvæ feed on water purslane (*Isnardia* sp.). Clumps of willows nearly always attract a few *Limenitis archippus floridensis*, and the roadside weeds may swarm with its model, *Danaus gilippus berenice. Papilio palamedes* may also be abundant here since its larvæ feed on magnolias in the Bay Tree hammocks of the Everglades. (June, excellent; July, good; August, fair; December, poor.)[2]

U. S. 41, east from Fort Myers, passes through somewhat different country. Mainly it is the complex flatwoods, gladeland, hammocks, and cypress swamps along the southern edge of the Big Cypress. Again the roadsides and spoil banks will probably be the most productive collecting places. At Monroe Station, about 50 miles southeast of Naples, I suggest that you turn south and follow Florida "Highway" 94. This is a rough road, but perfectly safe even in the wettest weather, and it leads through some of the wildest of the central Everglades. After the road turns back to the east the area to the north is outside the Everglades National Park, and there are many tropical hardwood hammocks in which the brilliant tree snails rival the butterflies. The area is often referred to as "Pinecrest." The edges of some of the hammocks can be reached from the roadside and offer good collecting. *Papilio cresphontes, P. palamedes, P. troilus ilioneus, P. glaucus australis, Limenitis, Danaus, Heliconius, Marpesia, Agraulis vanillæ nigrior, Asterocampa clyton flora, Appias drusilla neumœgenii, Ascia monuste,* and a variety of lycænids and skippers may be expected. (January, poor; August, fair.)

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[2] Dates in parentheses at end of paragraphs indicate times at which the writer has collected in the areas mentioned. They may help to predict the success you can expect.

The marl prairies in the "Pinecrest" area are particularly interesting for the day-flying moths of the family Amatidæ. The wasp-like *Syntomeida ipomœa* is sometimes found on the flowers of the Buttonbush, and *Cosmosoma* and others fly among the grasses and herbs. Among the butterflies, *Euptychia areolata* and *Lephelisca virginiensis* are often common, but the open glades are much poorer in species than the edges of the hammocks. (January, fair; July, excellent; August-September, fair.)

East of the "Pinecrest" area to Miami, the highway crosses another portion of the Everglades similar to that along U. S. 27. Here again the fig trees, roadside weedbeds, and canal edges may prove interesting.

MIAMI AND VICINITY: There were formerly many fine collecting places within or close to the city of Miami, but the human population has increased so rapidly in recent years that it is now difficult to find even a small patch of natural vegetation. However, some tropical species, especially those whose larvæ feed on introduced plants, are commoner in the city than anywhere else. *Phœbis philea,* for example, is most abundant around plantings of the Golden Shower Tree and seldom occurs in hammocks or pinelands far from houses. *Papilio polydamas lucayus,* although less strictly urbanized, is rare away from the cultivated Pipe Vine (*Aristolochia*). The skipper, *Asbolus capucinus* is nearly always found near plantings of Coconut or Royal Palms. It did not become common around Miami until after World War II, but in places its larvæ are now important economic pests. (March-July, excellent; August-October, fair; November-February, poor.)

Vacant lots, grown up with stands of *Bidens* and other weeds, may be worth looking over. *Strymon columella* is nearly always abundant on the flowers of *Bidens. Eurema messalina* subsp.?, *Anteos mærula,* and *Hypolimnas misippus* are species which seem to have been taken only in such situations around Miami. (March-July, good; August-February, fair to poor.)

BRICKELL HAMMOCK: The large hammock which formerly extended for more than a mile south from the Miami River is now nearly destroyed, but patches still remain where some collecting can be done.

Simpson Park, at the corner of south Miami Avenue and 14th Road, contains a portion of the original hammock through which trails have been cut. *Metamorpha stelenes,* which now seems to be an established migrant, was abundant there in June of 1947. *Eunica tatila tatilista* and *E. monima* may also be encountered along the trails. *Marpesia, Heliconius, Papilio cresphontes, Phœbis agarithe maxima, Appias, Ascia, Polygonus lividus savigny,* and *Pyrgus syrictus* are abundant at almost any time of the year. (March-July, excellent; August, fair; December, poor.)

Those who, like the writer, prefer to swing their net without worrying about the feelings of park superintendents, may find collecting places in the fragments of hammock on private property in other places. Recent clearings, if they can be found, are often extremely productive. The parkway on Brickell Avenue, just south of the approaches to the Rickenbacker Causeway, is one of my favorite spots. A typical hour's catch in June in this area in 1947 included: *Papilio polydamas lucayus, P. cresphontes, P. palamedes, P. troilus ilioneus, Hemiargus thomasi, Leptotes cassius theonus, Strymon m-album, S. cecrops, S. melinus, Appias, Ascia, Phœbis agarithe maxima, P. philea, P. statira floridensis, Agraulis, Heliconius, Marpesia, Polygonus,* and others. (March-July, fair to excellent; August, good; September, fair; December-January, poor to fair.)

Papilio aristodemus ponceanus, P. andræmon bonhotei, Lycorella ceres, and *Marpesia chiron* are rarities which have been taken or may be expected in Brickell Hammock.

The limestone bluffs and bay shore along Brickell Hammock are interesting collecting places if you can get to them. The Buttonwood Mangrove, when in bloom in June and July, attracts many insects including *Strymon mæsites* and *S. martialis* (See Young, *Ent. News* 48: 80-81; 1938). The Black Mangrove, which also blooms in June and July, may attract *Kricogonia lyside*, but this species seems to be commoner on the islands across the bay (See Young, *Ent. News* 49: 115; 1939). *Anæa floridalis, Danaus gilippus berenice, Phyciodes frisia, Hemiargus thomasi,* and *Agraulis* are more abundant along the bluffs than elsewhere. Here also may be found the day-flying moth *Composia fidellisima vagrans,* and the Red Mangroves attract *Phocides batabano* and several interesting moths. (June-August, excellent to fair.)

The larvæ of *Phoebis statira floridensis* feed on the large bean vine, *Ecastophyllum ecastophyllum,* which forms great jungle-like tangles behind the dunes along beaches or on the bayshore. There used to be a stand of this plant at the western end of what is now the Rickenbacker Causeway, and *P. statira* was nearly always found about it from March to August. Similar stands of the plant are found north along the coast and can often be recognized by the bright yellow males of *statira* which hover over them.

The Brickell Hammock area is an excellent collecting place for moths. Several rare species have been found at light or feeding on flowers in the evening. Beds of the common periwinkle and the flowers of the male papaya attract many sphinx moths, including the giant *Cocytius antæus.* (June-August, fair to excellent.)

PINELANDS AND HAMMOCKS SOUTH OF MIAMI: U. S. Highway 1 turns inland in Brickell Hammock, and more interesting country can be reached by continuing on into Coconut Grove and picking up the Old Cutler Road (also called Ingraham Highway).

Matheson Hammock about five miles south of Coconut Grove is part of a county park. The hammock is mostly west of the highway, and numerous trails offer collecting similar to that in Brickell Hammock. East of the road is an extensive area of mangroves and salt marsh situations. The zone in which the coastal marshes reach the rocky ridge is often productive of species not found commonly elsewhere. (July, good.)

Chapman Field, a plant introduction garden of the U. S. Department of Agriculture may be explored with profit. It is about four miles south of Matheson Hammock park, and contains extensive plantings of exotic trees and other plants. (August, fair.)

Still farther south along Old Cutler Road, the hammock along Black Creek used to be worth a stop, but it was being partly cleared in the Summer of 1955 and will probably soon be gone entirely. (June-July, good.)

All along the Old Cutler Road, fairly extensive areas of the rocky pinelands in natural condition may be encountered. These will probably disappear in a few years if the trend toward "rock farming" does not change. The pinelands are not as rich in species as the hammocks, but several interesting butterflies are characteristic. *Eumæus atala florida* was formerly abundant, but it is now nearly or quite extinct in Florida. Records of its reoccurrence would be worth a published note. The wild croton plants often attract *Strymon acis bartrami,* one of the prettiest of the hairstreaks. *Hemiargus ceraunus antibubastus* and *Eurema daira daira* form *jucunda* are also characteristics, often being found at the flowers of the sensitive briar. *Papilio marcellus* is common in the spring in areas where the Dwarf Pawpaw, *Pityothamnus* spp., grows.

The pinelands are often interrupted by marl prairies, now mostly under cultivation, which formed the drainways of the Everglades. They offer collecting similar to that found at "Pinecrest." (June-August, fair to excellent.)

AREA WEST OF GOULDS: The Old Cutler Road joins U. S. 1 at Goulds. West of here along Silver Palm Drive are many good Pineland and marl prairie situations. North of Silver Palm Drive, Kingman Road runs through hammocks which are good collecting places. Continuing west, you should turn south on Krome Avenue. Just east of this road on Bauer Drive are interesting oak hammocks, and Timb's Hammock is just to the east but now hard to get into. (January, fair to poor; March-July, excellent.)

HOMESTEAD AND FLORIDA CITY: Continuing on through Homestead, you will end up in Florida City. This area has never been particularly interesting to me, but Mrs. MARGUERITE S. FORSYTH, who lived there for many years, found many unusual species. Hammocks, pinelands, and marl prairies in the vicinity are similar to those already mentioned.

PINELANDS EAST OF EVERGLADES NATIONAL PARK: Continuing from Florida City toward the Everglades National Park, you will pass through some fine pineland of a different type from that farther north. Much of this area is being destroyed by the "rock farms," but oak hammocks, sinkholes in the pinelands, and the edges of borrow pits may offer different types of habitats. *Eurema neda* should be looked for here. According to KLOTS it prefers the shrubby borders of hammocks and does not fly in the open as does the common *lisa.* (July, excellent; August-September, fair.)

ROYAL PALM HAMMOCK: The old Royal Palm Hammock is now within the Everglades Park. Before attempting to collect, one must obtain clearance from the park authorities in Homestead. Collecting is allowed for teaching or museum purposes, but most collectors, like the writer, do not qualify.

The hammock has many fine "jungle trails" along which species similar to those noted for Brickell Hammock can be found. Among the rarities to look for is *Diæthria clymena,* the "88" butterfly, collected there in 1944 by P. G. HOWES. This is probably the only authentic record for this species in the United States. Another interesting species is *Eurema nisa perimede* (determined by W. D. FIELD) which was collected in the hammock by Mrs. C. N. GRIMSHAWE in December, 1946. It closely resembles *neda,* but differs in lacking the black border of the hind wing, the border being replaced by small black spots at the juncture of the veins with the margin. (March-August, fair to excellent.)

LONG PINE KEY: At the western edge of Royal Palm Hammock, a rock road turns northwest and leads onto Long Pine Key. This was one of the Everglades Keys which were islands before the drainage of the Everglades. Most of the area along the road is outside the park, and hammock edges, pinelands, and deep marshy sloughs are possible collecting places. It was in the pinelands on this island that *Eumæus atala florida* was last found about 1935. *Euptychia areolata* is often abundant in the damper pinelands, and *Limenitis archippus floridensis* is nearly always abundant. *Syntomeida ipomœa* may also be found at flowers of the Buttonbush along the edges of the marl prairies. (January, fair; June-July, excellent; November-December, poor.)

CAPE SABLE REGION: Returning toward Royal Palm Hammock, the southwest fork of the road leads to Cape Sable. All of the Cape is now within the park. Collecting on the salty marl prairie near Flamingo used to be very good. *Brephidium pseuofea, Precis lavinia zonalis,* and many other butterflies and skippers are abundant. I have seen literally clouds of *Ascia monuste* over the prairie, and *P. l. zonalis* guards its little territory as jealously as does our familiar *cœnia.* (June-July, good.)

KEY LARGO: In order to continue on to the Florida Keys, you will have to return to Florida City and follow U. S. 1. The first large island, about 21 miles southeast of Florida City, is Key Largo. There is generally good collecting almost anywhere along the road here, but I suggest that you get away from the traffic by turning north on the old highway and going to the north end of the island. The roadsides through the great Key Largo hammock probably offer the richest collecting place for Lepidoptera in Florida. *Dryas julia nudeola* (March-June?) is one species which you should find in abundance. *Composia fidellisima vagrans* sometimes almost swarms along with other day-flying moths. Many West Indian skippers and other butterflies have been recorded only from this area in Florida. (March-July, fair to excellent; August, fair; September-February, poor to good.)

UPPER AND LOWER MATECUMBE KEY: Going on down U. S. 1, you will cross a series of keys. Most of them are labelled by roadsigns so that you can locate yourself easily. Lower Matecumbe lies just north of the first long "overseas" bridge. The hammock on the north end of the island is in fairly natural condition, and you will probably want to stop here to look for *Papilio aristodemus ponceanus.* Don't worry about KLOTS' admonition on conservation too much. You will probably be happy if you SEE even one specimen. *Brephidium pseudofea* is common in the salt flats on both Upper and Lower Matecumbe, and many other things will be found on *Bidens* and other flowers. *Danaus eresimus* is a rarity which should be looked for on the Keys. MARSTON BATES suggests that the way to find it is to capture every *Danaus gilippus*-like butterfly possible and examine them carefully before letting them go. (June-July, good.)

KEY VACA: Key Vaca in the Middle Keys is now so built up that collecting places are becoming scarce. Recent clearings are productive if they can be found. *Metamorpha stelenes* is occasionally found, probably as a stray from the Bahamas. *Eurema daira palmira* occurs on Key Vaca, and the true *elathea* may also turn up someday. (July-August, good.)

BIG PINE KEY: Big Pine, the largest of the Lower Keys, is my favorite collecting place, but it is not particularly enticing to the lepidopterist. The peculiar pinelands are productive of some interesting things, however, and Bahaman and West Indian species may be expected. The island formerly had several well-developed hammock systems, but these have been all but destroyed by recurrent fires. Little Pine Key, which can only be reached by boat, probably shows the conditions which formerly prevailed on Big Pine, No Name, and the other large keys. It is so densely grown up with palms, hammock, and other plants that it is all but impossible to walk across it. The wonderful cactus growths along the southern point of Big Pine are interesting, and the beach hammock association here might harbor unsuspected prizes. (June-July, good; August-September, fair.)

KEY WEST: Key West itself is not very good for collecting since there is practically no open ground, but just to the north the botanical garden and edges of the golf course on Stock Island are good to fair. There is also a new road which runs across the outer edge of Boca Chica, the Saddlebunch Keys, and Sugarloaf where hammock, salt marsh, and other conditions may be encountered. A number of rare strays have been recorded from Key West and vicinity, but in general the collecting is inferior to that to be found farther north. *Papilio aristodemus ponceanus* has been recorded from Key West, in fact the late AUSTIN CLARK informed me that JOHN W. CADBURY, 3rd, checked the specimen in the Philadelphia Academy, and it proves to be the specimen figured by HOLLAND (Pl. LXX) and labelled "*Papilio ponceanus* Schaus, typical from Miami, Florida." If there were not a specimen in the Museum of Comparative Zoology at Harvard, collected in Coconut Grove by G. B. FAIRCHILD and his sister, this in my mind would throw doubt on the occurrence of *ponceanus* on the mainland. (June-July, good; September, fair.)

On returning to Miami, you may want to go north by way of U. S. Highway 1. Most of the area along this road is urbanized, but collecting places can be reached by turning off either to the east or west.

PINELANDS BETWEEN MIAMI AND DANIA: The pinelands north of Miami between U. S. 1 and U. S. 441 used to be grown up with extremely dense stands of the saw palmetto. Many fragments of this association can still be found. In the late spring and summer, the Tar Flower (*Befaria racemosa*) puts up flower heads above the palmettos, and many butterflies are attracted to them. Some of the more open areas are the best of collecting places for skippers. (March-August, excellent; December, poor.)

COASTAL AREA NORTH OF MIAMI BEACH: It is almost hopeless to try to collect on the Miami Beach peninsula, but by driving north along Florida A1A the open beach and natural dunes can be reached in places. Stands of *Ecastophyllum ecastophyllum* often grow between the dunes and the mangroves along the bayshore, and should be examined for *Phœbis statira floridensis.* *Eurema lisa* sometimes appears in migratory swarms similar to those observed in the Bahamas. Migrations of *Ascia monuste* and *Agraulis vanillæ nigrior* may also be observed in this area from March through May. (See Erik Tetens Nielsen & Astrid Tetens Nielsen, *American Mus. Novitates,* No. 1471, 1950, for an interesting account of migration in *Ascia.*) (July, excellent.)

FORT LAUDERDALE AND VICINITY: MARSTON BATES collected around Fort Lauderdale for a number of years, and recorded many interesting species. West of the city, and along U. S. 441, are pinelands and hammocks where northern and tropical plants intermingle. *Papilio palamedes* and other species may be more abundant here than farther south. *Isoparce cupressi,* the cypress sphinx, may be found rarely around cypress ponds or swamps. East of Fort Lauderdale, Florida Highway A1A parallels the Atlantic beach for some distance. Hammocks and dunes may be good collecting places. (July, good; August-September, fair.)

At West Palm Beach, U. S. 441 turns inland to Belle Glade and crosses the great Loxahatchee Slough of the northern Everglades. Here as along other roads through the Everglades, the roadside weedbeds will probably be the best collecting spots.

And so we say goodbye to the land of the Everglades. In the words of the Seminoles, "Wa lox-ee-ojus!" Good hunting!

APPENDIX: SOME GENERAL HINTS

Camping: Camping in southern Florida is somewhat difficult, but throughout the northern part of the state many excellent campsites are available. A list of state parks with camping facilities can be obtained from the Florida Board of Parks and Historical Monuments at Tallahassee, Florida. In many areas, however, campsites on unposted ground can be found almost anywhere. I usually take an Army Surplus jungle hammock with a light blanket for summer camping, and a light sleeping bag with mosquito net and frame and a tarapaulin for winter. Tourist courts are, of course, everywhere, and summer rates are usually reasonable.

Poisonous Snakes: The dangers from rattlesnakes and other poisonous serpents is greatly over-rated, but it pays to look where you are walking. A snake bite kit may be comforting to play with while you are getting to the nearest hospital in case you are bitten. Stop off at Ross Allen's Reptile Institute at Silver Springs if you want to be sure to see Florida rattlesnakes.

Mosquitoes: On the Florida Keys, Cape Sable, and in other southern areas mosquitos are often very bad during the summer months. Repellents, such as 612 or dimethyl pthalate, should be used freely. Oil of citronella is practically useless. Mosquito-borne diseases are not important in Florida today. Sandflies may be annoying in places, but can be inhibited with 612. An aerosol bomb to spray the inside of your mosquito net or tent if you are camping is highly desirable.

Mites and Venomous and Urticating Arthropods: The liberal application of 612 or benzyl benzoate to ankles and pants legs, cuffs, neckbands and other openings in the clothing will usually prevent the unpleasant effects produced by "red bugs" or "chiggers." Urticating caterpillars and venomous arthropods are not very common. Spirits of ammonia or household ammonia is useful in reducing pain from bites of scorpions, wasps, bees, etc. Ammonia is particularly valuable in relieving the itching and pain of stings of the little fire ants which are bad in some areas.

Hints on Collecting: The best seasons for collecting in Florida are, unfortunately, the wettest, and you must protect your specimens from molds and ants. A convenient method of drying specimens is to place them in cigar boxes which can be suspended above your car motor until thoroughly dried. Specimens put into tight containers without drying are usually covvered with mold and ruined in a few days. Naphthalene flakes seem to be somewhat more effective in inhibiting molds than paradichlorobenzene, but the latter gives better protection against ants. Cyanide bottles often get very damp and ruin many specimens, so that I prefer to kill butterflies with xylol carried in a small vial. They can then be immediately placed in small drug envelopes and stored in cigar boxes. This obviates much tedious sorting in the evening also. Nets should be as large and as sturdy as you can make them. They will take a terrific beating in the dense vegetation. An extension handle is often needed to reach some of the high-flying species.

Baiting: Baiting and sugaring are not as effective in south Florida as in many northern states, but a mixture of molasses, rum, and bananas often attracts swarms of the giant noctuid, *Erebus odora.*

A Word of Caution: If you cannot come to Florida yourself and are contemplating buying specimens for your collection, be sure that you are dealing with reliable people. In former years some unscrupulous persons made a practice of selling South American and West Indian species as being from Florida. Be wary of anything marked "Chokoloskee, Florida." Chokoloskee is an island south of the town of Everglade, near the western edge of the Everglades National Park. It is a fair collecting place, but hardly worth the expense of a visit. Similar conditions can be found at many places along the west coast from Naples south.

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BOOK REVIEW

MOTHS. By E. B. Ford. xix + 266 pp., 56 pls. (32 colored). 1955. Publisher: Collins, London. Available from E. W. Classey, 91 Bedfont Lane, Feltham, Middlesex, England, and other British booksellers, at 35s, plus postage. (Also published in America by The Macmillan Co., 60 Fifth Ave., New York, N. Y., U. S. A., at $7.50.)

This is a continuation and supplement of the work entitled "Butterflies", by the same author and publisher. It likewise is intended to present all those biological problems which can be properly shown by the Lepidoptera, but in this case assuming that specifically *moths* are the material of study, and that the interested reader will turn back to the volume on butterflies for the details already presented in it. But enough background is given here so that one can get a clear picture with this volume alone.

In the butterfly volume it was possible to illustrate all the few British forms, incidental to the more biological discussion, but with the many times larger moth fauna this clearly cannot be done; the plates do manage to show a great many of the British moths, both common and rare, — but only those large enough to be shown well by natural size photographs, either in color or in black and white. The micros, while a few are mentioned in the text, do not appear in the pictures.

I might say that the late CLYDE FISHER had made preliminary arrangements with me to prepare a corresponding work based on the American moths. After his death we heard nothing more, and looking on the present volume, I say frankly that I couldn't have done it!

While the butterfly volume illustrated all the British species, the present one only covers a hundred or two of the moth species, so that they serve to a more definite degree as illustrations of the biological laws discussed, than of the fauna as such. The text, as with the preceding volume, is definitely devoted to the laws and the known biological facts: "Moths" means definitely 'the known laws of biology as illustrated by the *British* moths'. Physiology, genetics (including polymorphism), protective devices, pests, geography, melanism and population and extinction are taken in turn, but the two fields presented richly and almost exhaustively are genetics and geography. In these two fields no other work can give anything like so clear a picture of what we know, and so clear a hint of what we can next hope to find out.

Now for a few more specific comments. The first is aimed at the editors: why could not the plates have been given a single numbering? With the double numbering and the irregular placing (no doubt due to the problem of binding) one has to refer back to the two lists of plates every time he wishes to turn from the mention of a moth to its illustration, and to the index every time he makes the reverse shift. There is nothing new about this, we have to do it with almost every book, but it is always a new irritation. Incidentally the plates are beautifully reproduced, and only occasionally the colored ones show the tinted veil so common in three-color work, or the black and white plates less sharpness of detail than we could hope for.

In the author's statement of the reason for neglecting the micro-Lepidoptera, he writes: "less suitable for these studies, being more difficult to handle". I feel this is the reverse of the fact; at least one group of micros (the stored food pests) are on the whole easier to handle, and *Ephestia* at least has been used several times for genetic work just for that reason. There are other reasons that no doubt are the real ones, — they are less often collected by the amateur, with the result that we lack records of distribution and are more often plagued by misdetermined records. If you consider the related fact that many manuals omit them, I think you have two thirds of the story. I grant the other third: they are difficult to handle . . . as dried adults.

I am sorry that the Kloet & Hincks check list was followed for the scientific names. It may be closer to the present rules than names previously used, but none of the familiar works on European moths have used it, and unless one has a popular

English work that gives the more standard English names, he is often completely lost. At least the traditional scientific names should have appeared as synonyms. In the case of "Caradrinidæ" (instead of the traditional names of Noctuidæ, Agrotidæ, or even "Phalænidæ") the word "noctuid" appears on p. 233, but even there there is no indication that the "Plusiidæ" are also noctuid moths, *Plusia* in fact differing from *Caradrina* probably far less than either differs from such a "Plusiid" as *Zanclognatha.* Incidentally both larva and adult show that *Callimorpha* is not a Hypsid but a slightly aberrant Arctiid, hardly more than a subgenus of the American *Haploa,* which all workers put in the Arctiidæ. The superfamily "Notodontoidea" is also a complete mess, for the Notodontidæ themselves are close to the Noctuidæ in egg, larva, and tympanum, while the geometers are something quite different (FORD lists the latter as five families); and the Polyplocidæ which are here listed in the Notodontoidea are hardly more than a subfamily of the Drepanidæ, which stand as a superfamily by themselves. I also see GEOFFROY'S misprint of *"Tinæa"* preferred to the Linnæan and classical Latin *"Tinea".* Incidentally the Psychidæ, which give the name to his Psychoidea, are much closer to the Tineidæ than to the Zygænidæ, which he groups with them. A very little study of *Solenobia* shows the situation.

I think when Dr. FORD discusses the relative uses of collections and studies, he should have emphasized the value of a collection as a *record.* Some one may later ask what you were really studying; a good photograph may tell the story, but a few specimens saved from a genetic study are much safer in such a genus as *Ephestia.* If ancient specimens had not been saved, who would have guessed that the "Army Worm" of western Europe is not one of the Asiatic or South American kinds, but actually the one from North America?

There is a good chapter on industrial melanism; but I wish some one would give us a similar picture of the same phenomenon over here, known for many years about Pittsburgh, but now showing in hundreds of species well over the Northeast.

I am not clear why the compound eye should be considered "rather inefficient." Considering its size and the size of insects in general, it could hardly be more efficient.

I should hardly say that butterfly antennæ usually end in a "knob"; much more often there is merely a gradual swelling, and even this may be slight in some Satyrs. The combined character of swollen antenna and no frenulum will doubtless define a butterfly in Europe and the U.S., but I have often been embarrassed by some beginner who had got hold of a specimen of *Urania.*

I think the question of bright colored hind wings and under sides, concealed at rest, is much more complicated than FORD would make it. Consider the Catocalas, night fliers but some of them easily flushed by day, and even more the yellow-winged Agrotids, so common in Europe, and so nearly absent in America, with no obvious explanation.

Note that a couple of moths from Kerguelen Island alone have lost their wings in both sexes. They are only micros, but are believed to belong to at least two families winged in other parts of the world.

The production of diffraction colors seems somewhat misstated or at least will be almost certainly misunderstood; for the bright structural colors, such as the blues and the green Foresters, are produced not by the minute striation, but by piles of thin superimposed plates; the striation colors are never conspicuous, and usually overlooked. They can be seen however in some species by illuminating a specimen with a narrow beam of light, such as a ray of sunlight, in a dark place. It is easily distinguished by the fact the color changes with a small change of angle, while the thin-plate type remains about the same unless actually glancing viewing and illumination are used.

As to killing, I understand that conditions are quite different in England, where it is traditionally hard to get cyanide, but I find it safe even with such very delicate greens as our *Dichorda iridaria,* while ammonia kills erratically and changes many other colors.

The *Colias* "blue" mutant is called bright blue; in fact it is merely blue-green, rather than the usual grass-green. My impression is that there is merely a failure to deposit carotin-type pigments.

I think that the girth of *Papilio* and Pierid pupæ is not the vestige of a cocoon, for both coexist in many Skippers, if not perhaps all. I was interested to discover a few years ago that *Papilio* has all the instincts of a Nymphalid in shedding its skin without losing its hold on the silk button. I had a *P. philenor* larva fail to spin the usual girth. It pupated perfectly, hanging by its tail like a *Vanessa.*

Cocoons are stated to be a protection against damp and mould. No doubt they are in a highly humid country like England, but I am sure that in more of the world they are a protection against drought, which is the chief killer when an entomologist over here gets careless. This is certainly true of our Cecropia, Promethea and Polyphemus, which soon dry up if removed from their heavy cocoons, and I think equally if a Sphinx is dug up without precaution. I think species from the humid tropics are much more likely to have open-mesh cocoons like the *Cingilia* group of geometers and *Urodus.*

For the record, the Gypsy Moth was not "accidentally" introduced to America, but brought in purposely by TROUVELOT, who thought it might produce a useful silk (not need such delicate treatment as the Chinese silkworm). The story is that a maid swept the cocoons with egg-masses out the window, and not all were recovered. In any case there seems to have been only a single introduction, and we never have the flying females that FORD mentions.

As *Panaxia dominula* is not a Hypsid but a somewhat aberrant Arctiid, one can say of the group of moths listed on p.11 which have the same scent: "all Arctiidæ".

As to light-perception in insects, shouldn't the Diptera be mentioned as having a range of visibility much like our own, which is stated curiously as approximately 4000 to 7800 Å; I think 3800 to 7000 is closer to an average person's range? On the last line of p. 15, apparently "repulsion" is accidentally written for "attraction"; of course the repulsion sphere is the smaller, since most moths approach a light pretty directly until close, and only then begin to circle or even fly away.

The same reversal of our experience appears again on the next page; and I can only wonder if moths may not actually behave differently in the Old and the New World. If one seeks a reason why they might, there is always the problem of the effect of primitive man and his fires. He certainly existed and used fire untold millenia in the Old World, before he got over to America perhaps only some ten thousand years ago. The European moths that should have behaved like American ones about the lights, may all long since be extinct.

Well, this is my reaction to only a few pages of this fascinating FORD book. My copy has many more notes on its margins, and I wish I might write a book of comment; but our editor would certainly behead this review if I did (and justly). So I will end by saying it is a "must" for any one interested in moths beyond the pinned collection, even though it has kept almost too strictly to the limitation of "British Moths" and Macrolepidoptera.

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NOMENCLATURE NOTICE

An application for suppression, for purposes of type selection, of *A guide to an arrangement of British Insects* (1837), by J. Curtis, has been received by the International Commission of Zoological Nomenclature. Any specialist who may wish to comment on this application should write the Commission Secretary, FRANCIS HEMMING, 28 Park Village East, Regent's Park, London, N.W. 1, England, as soon as possible and no later than July 1956. The application may be seen in full in *Bull. Zoological Nomenclature,* vol.9: part 12 (January, 1956).

C. L. REMINGTON

RECENT LITERATURE ON LEPIDOPTERA

(Under the supervision of PETER F. BELLINGER)

F. BIOLOGY AND IMMATURE STAGES

Allen, H. W., "Nosema disease of *Gnorimoschema operculella* (Zeller) and *Macrocentrus ancylivorus* Rohwer." *Ann. Ent. Soc. Amer.,* vol.47: pp.407-424. Sept. 1954. Biology of this microsporidian disease in moth and parasite; control methods in culture work are described. [P.B.]

Baeta-Neves, C. M., "A entomofauna das 'exóticas' em Portugal" [in Portuguese]. *Portug. Acta Biol. (B),* vol.4: pp.191-196. 2 Oct. 1954. List, by foodplants, of insects on exotic plants in Portugal; records *Evetria tesselatana* on *Cupressus, Thaumatopœa pityocampa* on *Pinus radiata* and *Pseudotsuga douglassi, Cacœcia pronubana* on *Myoporum acuminatum, Dicranura vinula* on *Populus, Semasia minutana* on *Populus alba, Zeuzera pyrina* on *Quercus rubra, Sciapteron tabaniforme* on *Populus robusta; Mimas tiliæ* on *Tilia spp.* [P.B.]

Baird, R. B., "A species of *Cephalosporium* (Moniliaceæ) causing a fungous disease in larvæ of the European corn borer, *Pyrausta nubilalis* (Hbn.) (Lepidoptera: Pyraustidæ)." *Canad. Ent.,* vol.86: pp.237-240, 5 figs. 9 July 1954. Discusses etiology, symptomatology, and pathology of this disease. [E.M.]

Belosel'skaia, Z. G., "The moth *Argyresthia ephippella* F. as a pest of cherries and plums" [in Russian]. *Ent. Obozrenie,* vol.32: pp.86-92, figs. 1952. [Not seen].

Belyea, R. M., "Death and deterioration of balsam fir weakened by spruce budworm defoliation in Ontario." *Canad. Ent.,* vol.84: pp.325-335, 7 figs. 28 Nov. 1952. Discusses seasonal histories and habits of 7 spp. of Coleoptera and 3 spp. of Hymenoptera breeding in severely defoliated and dead trees. [E.M.]

Bennett, William H., "The effect of needle structure upon the susceptibility of hosts to the pine needle miner (*Exoteleia pinifoliella* (Chamb.) (Lepidoptera: Gelechiidæ)." *Canad. Ent.,* vol.86: pp.49-54, 5 figs. 10 March 1954. States that large or numerous resin canals tend to reduce favorability of a *Pinus* sp. as a host for this insect. [E.M.]

Bennett, Wm. H., "The metamorphosis of the pine leaf miner (*Exoteleia pinifoliella* (Chamb.)) (Lepid. Gelechiidæ)." *Canad. Ent.,* vol.86: pp.310-311, 1 fig. 20 Aug. 1954. Describes pupation, pupal cell, and emergence of adult. [E.M.]

Blais, J. R., "Effects of the destruction of the current year's foliage of balsam fir on the fecundity and habits of flight of the spruce budworm." *Canad. Ent.,* vol.85: pp.446-448. 31 Dec. 1953. Complete defoliation is associated with reduced egg production, and with massive flights into adjoining areas. [E.M.]

Bourgogne, J., "Le venin de vipère utilisé comme nourriture par une tinéide (Lep.)" [in French]. *Bull. Soc. Ent. France,* vol.59: pp.74-75. 1954. The desiccated venom of *Vipera aspis* used as food by *Tineola bisselliella* in the Institut Pasteur, Paris. [P.V.]

Brandt, H., "Massenauftreten von *Biston zonarius* Schiff. (Lep., Geometridæ) an Luzerne" [in German]. *Nachrbl. Bayer. Ent.,* vol.3: p.64. 15 June 1954. Caterpillars were numerous on alfalfa. [N.O.]

Brandt, H., "*Procris pruni* Schiff. (Lep., Anthroceridæ) an Erdbeere" [in German]. *Nachrbl. Bayer. Ent.,* vol.3: p.64. 15 June 1954. Strawberry as a new foodplant. [N.O.]

Brooks, A. R., "Identification of bombyliid parasites and hyperparasites of Phalænidæ of the Prairie Provinces of Canada, with descriptions of six other bombyliid pupæ (Diptera)." *Canad. Ent.,* vol.84: pp.357-373, 46 figs. 31 Dec. 1952. Describes, keys, and figures larvæ, pupæ, and/or adults of 11 spp. associated with Phalænidæ. [E.M.]

Buresh, I., "Die Nonne *Ocneria monacha* als Schädling in der Wäldern Bulgariens" [in Bulgarian, German summary]. *Izv. Zool. Inst. Bulg. Akad. Nauk,* vol.2: pp.3-54. 1953. [Not seen].

Campbell, I. M., "Morphological differences between the pupæ and the egg clusters of *Choristoneura fumiferana* (Clem.) and *C. pinus* Free. (Lepidoptera: Tortricidæ)." *Canad. Ent.,* vol.85: pp.134-135, 2 figs. 15 April 1953.

Chapman, John A., John I. Romer, & John Stark, "Ladybird beetles and army cutworm adults as food for grizzly bears in Montana." *Ecology,* vol.36: pp.156-158. Jan. 1955. *Chorizagrotis auxilaris;* moth may estivate in numbers in high mountains. [P.B.]

Cumming, Margaret E. P., "Notes on the spruce needle miner, *Taniva albolineana* Kft. (Olethreutidæ: Lepidoptera)." *Canad. Ent.,* vol.86: pp.457-460, 2 figs. 5 Nov. 1954. Briefly describes life history; enumerates various spp. of spruce known to be hosts; lists 2 ichneumonid and 5 braconid parasites. [E.M.]

Dondale, C. D., "Biology of *Agathis laticinctus* (Cress.) (Hymenoptera: Braconidæ), a parasite of the Eye-Spotted Bud Moth, in Nova Scotia." *Canad. Ent.*, vol.86: pp.40-44, 6 figs. 29 Jan. 1954. Describes larvæ, life-cycle, and habits, and lists several predators and hyperparasites. [E.M.]

Doutt, Richard L., "The teratoid larva of polyembryonic Encyrtidæ (Hymenoptera)." *Canad. Ent.*, vol.84: pp.247-250. 29 Aug. 1952. The asexual larvæ of *Copidosoma* spp., parasites of *Plusia* larvæ, are discussed. [E.M.]

Graham, Violet E., "Notes on the life histories of some butterflies of B. G." *Timehri*, no.33: pp.17-22, 2 pls. Oct. 1954. More or less extensive notes on British Guiana Lepidoptera: *Papilio anchisiades* (lime), *"Catopsilia" eubule, "C." philea, "C." statira* (*Cassia* spp.), *"C." argante* (*Pithecolobium*), *Pieris monuste* (*Cleome, Gynandropsis*), *"Dione" vanillæ* (*Passiflora*), *Anartia jatrophæ* (*Ruellia*), *Hemiargus zachæina* (*Vigna luteola*), *Thecla* sp. (*Cordyia cylindrostachya*), *Helicopus cupido* (*Montrichardia*), *Eudamus dorantes* (*Desmodium*), *Mænas laboulberi* (sic!) (*Cabomba* & other water weeds, feeding beneath the surface) (foodplants in parentheses). [P.B.]

Harcourt, D. G., "A species of *Tetrastichus* new to North America." *Canad. Ent.*, vol.85: p.251. 23 July 1953. Records *T. sokolowskii*, a hymenopterous parasite of *Plutella maculipennis*, previously known from Russia and southern India. [E.M.]

Harris, Lucien, Jr., "An account of the unusual life history of a rare yucca skipper (Megathymidæ)." *Lepid. News*, vol.8: pp.153-162, 3 pls. 7 Jan. 1955.

Henson, W. R., R. W. Stark, & W. G. Wellington, "Effects of the weather of the coldest month on winter mortality of the lodgepole needls miner, *Recurvaria* sp., in Banff National Park." *Canad. Ent.*, vol.86: pp.13-19, 1 fig. 29 Jan. 1954. Notes correlation of zones of extremely low temperature with zones of high winter mortality. In general, in the Bow valley, regions of extremely low temperature are at high or low elevations, middle altitudes tending to have more moderate temperatures and to act as centres of reinfestation after periods of severe winter kill. [E.M.]

Jovancevic, M., "Pine caterpillar (*Cnethocampa pityocampa*) found on strawberry trees (*Arbutus unedo*)" [in Serbian]. *Sumarski List*, vol.77: pp.414-426. Sept./Oct. 1953. [Not seen].

Kasy, Fritz, "*Phytometra* (*Plusia*) *zosimi* Hbn.: über die ersten Stände, Biologie und Zuchtergebnisse" [in German]. *Zeits. Wiener Ent. Ges.*, vol.38: pp.321-333. 15 Dec. 1953. Immature stages, biology, and feeding experiments. [N.O.]

Kurir, A., "Vergrösserung der Zahl dere Raupenstadien und Verlängerung des Raupenlebens durch die Nahrung" [in German]. *Bodenkultur*, vol.6: pp.355-382. 1952. [Not seen].

Leclercq, J. & M., "Sur *Euproctis chrysorrhœa* L. (Lep. Lymantriidæ). Parasites - cas d'urtication" [in French]. *Lambillionea*, vol.54: pp.53-55. 25 Aug. 1954. On the parasites of *E. chrysorrhœa* and indication of a case of skin rash cured by the antihistaminic substances. [P.V.]

Lindsay, I. S., "Influence of temperature on embryonic development of the pale western cutworm, *Agrotis orthogonia* Morr. (Lepidoptera: Phalænidæ)." *Canad. Ent.*, vol.86: pp.557-561, 2 figs. 7 Jan. 1955. Developmental rates at 10, 15, 20, 25, and 30°C. are plotted. A morphological key to stages of development is presented. Development is not completed at 5° or 35°. [E.M.]

McGuffin, W. C., "Description of larvæ of forest insects: *Syngrapha, Autographa* (Lepidoptera: Phalænidæ)." *Canad. Ent.*, vol.86: pp.36-39, 6 figs. 29 Jan. 1954. Describes and distinguishes last-instar larvæ of *S. selecta, S. alias, S. epigæa*, and *A. ampla*. [E.M.]

McGuffin, W. C., "Notes on life histories of some Ennominæ (Lepidoptera, Geometridæ)." *Canad. Ent.*, vol.87: pp.41-44. 28 Jan. 1955. Gives brief notes on *Semiothisa granitata, S. sexmaculata, Eufidonia discospilata, Melanolophia canadaria, Campæa perlata, Selenia alciphearia*, and *Caripeta divisata*. [E.M.]

McGugan, Blair M., "Needle-mining habits and larval instars of the spruce budworm." *Canad. Ent.*, vol.86: pp.439-454, 4 figs. 5 Nov. 1954. Needle-mining is established as a regular activity of the young *Choristoneura fumiferana* larva; details of the habit are discussed. Six larval instars are demonstrated by use of head-capsule statistics. Criteria for recognition of instars are discussed. By using a combination of characters, the instars can be distinguished with reasonable accuracy. [E.M.]

MacKay, Margaret R., "The larvæ of *Choristoneura fumiferana* (Clem.) and *C. pinus* Free. (Lepidoptera: Tortricidæ)." *Canad. Ent.*, vol.85: pp.128-133, 14 figs. 15 May 1953. Describes, figures, and compares larvæ of the two spp. [E.M.]

MacKay, Margaret Rae, "The last-instar larva of *Epinotia medioviridana* (Kft.) (Lepidoptera: Olethreutidæ)." *Canad. Ent.*, vol.85: pp.404-407, 14 figs. 4 Dec. 1953. Describes larva reared on *Rubus odoratus*. [E.M.]

MacKay, Margaret Rae, "The egg and larva of *Coryphista meadi atlantica* Munroe (Lepidoptera: Geometridæ)." *Canad. Ent.* vol.86: pp.284-288, 25 figs. 10 June 1954. Describes and figures larva of *C. meadi atlantica* on the basis of material from Ottawa, Canada. [E.M.]

McLeod, J. H., "Notes on the lodgepole needle miner, *Recurvaria milleri* Busck (Lepidoptera: Geometridæ), and its parasites in western North America." *Canad. Ent.*, vol.83: pp.295-301, 1 fig. 16 Nov. 1951. Notes on the distribution, life-cycle, and abundance of population identified as *R. milleri.* A number of species of parasites are recorded, and the relative abundance of some of them is discussed. [E.M.]

MacPhee, A. W., "The influence of spray programs on the fauna of apple orchards in Nova Scotia. V. The predacious thrips *Haplothrips faurei* Hood." *Canad. Ent.*, vol. 85: pp.33-40. Discusses ecology and life history of *H. faurei,* including its role as an egg-predator of *Spilonota ocellana* and *Carpocapsa pomonella.* [E.M.]

Milianovskiĭ, E. S., & P. I. Mitrofanov, "*Phassus schamyl* as a new pest of grape cultivation in Abkhaz" [in Russian]. *Ent. Obozrenie,* vol.32: pp.82-85. 1952. [Not seen].

Miller, C. D. F., "Note on *Ancistrocerus parietum* (Linnæus) (Hymenoptera: Vespidæ)." *Canad. Ent.*, vol.86: pp.197-198, 4 figs. 9 July 1954. A nest was provisioned with 5 tortricid larvæ. [E.M.]

Moucha, Josef, & Dalibor Weiss, "Zur Lebensweise von *Clostera (Pygæra) anastomosis* L." [in German]. *Nachrbl. Bayer. Ent.*, vol.3: pp.68-69. 15 July 1954. Discusses biology. [N.O.]

Paclt, J., "Systematisches Verzeichnis der in Mittleuropa als Forstschädlinge auftretende Schmetterlinge" [in German]. *Beitr. Ent.*, vol.3: p.1-29. 1953. Lists Central European moths feeding as larvæ on forest plants. [N.O.]

Phillips, C. M., Gordon E. Bucher, & June M. Stephens, "Note on preliminary field trials of a bacterium to control the codling moth." *Canad. Ent.*, vol.85: p.8. 30 Jan. 1953. *Bacillus cereus* as a pathogen of *Carpocapsa pomonella.* [E.M.]

Pinker, Rudolf, "Erfahrungen mit *Gnophos operaria hoefneri* Rbl." *Zeits. Wiener Ent. Ges.*, vol.38: pp.152-154, 2 figs. 15 June 1953. Biology, description of the larva. [N.O.]

Pollard, D. G., "The occurrence of *Amsacta moloneyi* Druce on cotton in the Sudan (Lepid. Arctiidæ)." *Rev. Zool. Bot. Afric.*, vol.49: pp.265-272, 1 fig. 14 Aug. 1954. Description of the larva of *A. moloneyi,* with chætotaxy; records and observations in the Sudan. [P.V.]

A CORRECTION

Mr. E. L. Bell of New York has drawn my attention to a very serious mistake in my recently published *Catalogue of the American Hesperiidæ,* Volume 4. I have placed the name *otho* Abbot & Smith as a synonym of *Polites coras* Cramer and replaced it in the genus *Wallengrenia* by *pustula* Geyer as a subspecies of *druryi* Latreille. I checked up and found I had entered on my card for *otho* that "the upper figure on Abbot and Smith's plate was to be taken as the type and that it represented *coras*", dated 4th November, 1941. I cannot understand how I came to make this utterly incorrect decision. I can of course think of the further checks I ought to have made. But it is no good crying over spilt milk, and I would ask all possessors of the book to eliminate *otho* as a synonym of *coras;* to place *otho* as a specific name in place of *druryi* and as a subspecific name in place of *pustula,* which name becomes a synonym of *otho;* to alter in the index the reference number for *otho.* In a book of this nature there are certain to be a number of additions and amendments, which can be announced in due course, but in respect of this major blunder I feel that immediate action is needed.

W. H. Evans
Honorary Associate, British Museum (Natural History)

NOTICES

Would like to exchange Japanese butterflies for those from anywhere in the world. Correspondence invited. Yoshiharu Jingo, 1478 Nippori-3, Arakawaku, Tokyo, JAPAN.

Boloria distincta Gibson, *Erebia youngi herscheli,* etc., from Yukon, N.W.T. border, for sale. Colin Wyatt, Cobbetts, Farnham, Surrey, ENGLAND.

Wanted: Papered Rhopalocera, esp. Nymphalidæ and Pieridæ (*Colias*) from all parts of North America, esp. mountains. Material from foreign countries also desired. Will exchange for the above species from the Formosan Central Mts., Europe, and Wisconsin. Exchange list on request. Donald L. Baber, 1511 Drake Ave., Burlingame, Calif., U.S.A.

I need urgently the following for study: adult specimens, pinned or papered, with full data, of all species, subspecies, and forms of North American *Limenitis.* Also need living pupæ of the above. Will purchase *or* exchange extremely limited stock of District of Columbia and adjacent Maryland butterflies; will have many more specimens for exchange this summer. Ward Watt, 1206 Parker Ave., Hyattsville, Md., U.S.A.

For sale: *Œneis, Erebia, Colias,* and *Boloria* from far Northern Canada at reasonable prices. R. J. Fitch, 2235 Pandora St., Vancouver, B.C., CANADA.

For sale: Barnes, McDunnough, and others: *Contributions to the Natural History of the Lepidoptera of North America*: Vols. 1-4, half leather; Vol.5, paper covers. Excellent condition. Inquiries to Prof. B. Hocking, Dept. of Entomology, University of Alberta, Edmonton, Atla., CANADA.

For sale: 1955-56 *ex larva,* carefully papered adults of *Triodes* (= *Ornithoptera*) *urvilliana, victoria; Papilio woodfordi, rhadamantus; Attacus atlas lorquini.* Max Richter, Butterfly Farm, East Durham, N.Y., U.S.A.

Have several thousand European butterflies and moths, papered, named, with full data, about 300 different species, for exchange against butterflies from the Americas, Asia, Australia or Africa. Will help build up representative coll. of European Lepidoptera. T. W. Langer, Royal Library, Copenhagen, DENMARK.

Needed urgently for study: all species and subspecies of North American *Polygonia.* Will offer in exchange New England Rhopalocera in quantity, and a limited amount of material from Florida and Colorado. IMPORTANT: Only the abdomens of *Polygonia* need be in A-1 condition. Other North American Rhopalocera will be acepted in exchanges. Richard S. Smith, Delta Sigma, Wesleyan Station, Middletown, Conn., U. S. A.

Wanted: living noctuid pupæ for forced emergence during winter months 1955-56. Any species acceptable, but Northern Army Worm (*P. unipuncta*) and Spotted Cutworm (*G. c-nigrum*) preferred. A. E. Treat, The City College of New York, New York 31, N. Y., U. S. A.

Alaskan butterflies for sale: *Parnassius eversmanni* ♂ A $5.00, ♂ B $4.00; *Papilio machaon aliaska* ♂ A $4.00, ♂ B $2.75; *Œneis jutta alaskensis* ♂ A $3.00, ♂ B $2.00, ♀ A $4.00, ♀ B $3.00. "B" specimens have small nicks or tails missing. All specimens have complete data including altitude. Will consider exchange for desired Nearctic *Erebia* (Arctic material only). P. R. Ehrlich, Dept. of Entomology, University of Kansas, Lawrence, Kansas, U. S. A.

EMPLOYMENT NEEDED

An expert preparator and breeder of Lepidoptera is seeking an entomological position. He has also had many years' experience in Europe as manager of a plant protection experiment station. Interested persons please write: Mr. George Pronin, 516 Cole Street, San Francisco 17, Calif., U.S.A.

The Lepidopterists' Society

LIST OF MEMBERS

December 1955

The list is arranged alphabetically by nations within each continental area, and by states or provinces in the U. S. A. and Canada. State, province, and nation names are here omitted in the address of each member. The address is followed by the lepidopterological interests. Where only "RHOP.", "MACRO.", or "MICRO." appears, the interest is general within the respective group. "LEPID." is used where interests include all three of the above groups. Following the interests among taxonomic groups are the other aspects of lepidopterology in which the member is interested. The member's name preceded by an asterisk (*) indicates Charter Membership; his name in capital letters indicates Sustaining Membership. The word "Nearctic" here means America north of Mexico. For uniformity "Noctuidæ" is used for all cases, even though the equivalent name "Phalænidæ" had been placed on the membership card by some members. Similarly, *Speyeria, Boloria,* etc. are used for the Nearctic species formerly placed in *Argynnis, Brenthis,* etc. The following abbreviations are used:

LEPID. — All Lepidoptera
RHOP. — Rhopalocera (butterflies)
MACRO. — Macroheterocera } (moths)
MICRO. — Microlepidoptera } (moths)

esp. — especially
Coll. — Collection
Ex. — Exchange

Please do not write any member on this list, asking him to exchange specimens, unless "Ex." is stated after his name.

HONORARY LIFE MEMBERS

"Individuals, not exceeding ten in number, who have made important contributions to the science of lepidopterology, may be elected Honorary Members of the Society."

Brig. W. H. EVANS, Department of Entomology, British Museum (Natural History), London S.W. 7, England, U.K. (Hesperiidæ)

*Prof. WM. T. M. FORBES, Commander Hotel, Cambridge 38, Mass., U.S.A. (Lepidoptera: Classification; Biogeography)

*Dr. KARL JORDAN, Zoological Museum, Tring, Herts., England, U.K. (Papilonidæ, Sphingidæ, Saturniidæ)

*Dr. JAMES H. MCDUNNOUGH, Nova Scotia Museum of Science, Halifax, N.S., Canada. (Microlepidoptera, esp. Coleophoridæ)

AFRICA

BELGIAN CONGO

Seydel, Charles, B.P. 712, Elisabethville, LEPID: esp. African. Coll. Sell.

GOLD COAST

Johnson, F.L., United Africa Co., Ltd., P.O. Box 22, Akim-Oda. RHOP: of world, esp. Papilionidæ (esp. *Troides* [=*Ornithoptera*]) and *Charaxes* (African).

KENYA

Sevastopulo, D. G., c/o Messrs. Ralli Bros. Ltd., Box 881, Mombasa. RHOP. MACRO. Life History, Genetics. Coll. Ex.
Van Someren, V.G.L. (Dr.), Box 1682, Nairobi. LEPID. of Africa. Coll.

LIBERIA

Fox, Richard M. (Dr.), Liberian Institute, Harbel. RHOP: esp. Ithomiidæ. Comparative anatomy of insects.

SOUTH AFRICA

Clark, Gowan C., Museum and Snake Park, Port Elizabeth. African RHOP: Life History.
Van Son, G. (Dr.), P. O. Box 413, Pretoria. RHOP: esp. Papilionidæ, Pieridæ, Nymphalidæ, Satyridæ. MACRO. Life History. Coll. Ex. Rear.

ASIA AND INDOAUSTRALIA

AUSTRALIA

Burt, William, 19 James St., Dandenong, Victoria. LEPID. Coll. Ex.
Common, Ian F.B., Div. of Entomology, C.S.I.R.O., P.O. Box 109. City, Canberra, A.C.T. MACRO: Australian Noctuidæ. MICRO: Australian Torticidæ. Life History, Behavior, Migration. Coll.
Fairey, K. D., Box 1176, G.P.O., Sydney, N. S. W.
Holmes, David R., "Holmden", Red Hill, Victoria. RHOP. MACRO. Coll. Ex.

INDIA

Shull, Ernest M., Ahwa, via Billimora, Dangs District, B.P.

INDONESIA

Sollaart, A., Rali Bakar Estate, P.O. Bose 3, Malang, East Java.
Wegner, A.M.R., Museum Zoologicum Bogoriense, Bogor.

JAPAN

Azuma, Masao (Prof.), 27/0 Kamiyoshihara-machi, Nishinomiya, Hyogo Pref. MACRO: esp. Geometridæ. MICRO: esp. Pyralididæ. Life History, Distribution. Coll. Ex.
Fujioka, Tomoo, Ho-13, 10 Nishikata-machi, Bunkyo-ku, Tokyo.
Futo, Miyuki, No. 2, 19 Kamishinyashiki-cho, Hikone City, Shiga. RHOP: esp. Lyænidæ. Ecology. Life History. Coll. Ex. Rear.
Hayano, Ikua, 337 Shinohara-cho, Kohoku, Yokohama.
Inoue, Hiroshi, Eiko Gakuen, Jesuit High School, Funakoshi-Machi, Yokosuka. MACRO: esp. Geometridæ, Cymatophoridæ, Drepanidæ. Life History. Coll. Ex.
Iwase, Tarô, 4 Shinhana-cho, Hongo, Tokyo. RHOP. Life History, Migration.
Jingo, Yoshiharu, 1,478 Nippori-3, Arakawa-ku, Tokyo. RHOP. MACRO. Coll. Ex.
Kurako, Hiroshi, Hikosan Biological Lab., Kyushu University, Hikosan, Soeda-machi,, Jagawa-gun, Hukuoka. MICRO: esp. *Cosmopteryx, Lithocolletis, Lyonetia, Stigmella,* etc. Life History.
Kuwayama, Satoru (Dr.), Hokkaido Agricultural Experiment Station, Kotoni, Sapporo. RHOP. MACRO: esp. Noctuidæ. Life History. Coll.
Kuzuya, Takeshi, Minami-Sonomachi 1-3, Nakaku, Nagoya.
Momoi, Shigeyuki, 282 Sannotani, Hommoku, Yokahama.
Ogata, Masami (Dr.), Ogata Hospital, No. 18, 3-chome, Imbashi, Higashi-ku. RHOP. RHOP: esp. Hesperiidæ. MACRO: Noctuidæ, Agaristidæ, Arctiidæ. Genitalic studies. Coll. Ex.
Ohba, Namoru, 10 Tonoyama, Nakano-ku, Tokyo. RHOP: esp. Papilionidæ, *Parnassius, Cœnonympha,* etc. Distribution. Coll. Ex.
Okada, Yoshio, Yanagida-Cho, Saga, Kyoto. RHOP: esp. Papilionidæ, Satyridæ, Lycænidæ. Biogeography, Morphology. Coll. Ex.
Okura, J., 1.566 2-chome, Chimo-Shakujii, Nerimaku, Tokyo. RHOP: Papilionidæ. Coll. Ex. Buy.
Shirôzu, Takashi (Prof.), Biol. Lab., General Education Dept., Kyushu University, Fukuoka. RHOP. Life History, Food Plants, Distribution. Coll.

Takahashi, A., 70, 1-chome Shoeicho, Mizuho-ku Nagoya.

Tsuruta, Ts. (Dr.), c/o T. Shimoda, 3-chome, 91 Sekimachi, Nerima-ku, Tokyo. LEPID. Life History. Coll. Ex.

Watanabe, Masato, 620 Ishizu-cho, Sakai, Osaka. RHOP: Papilionidæ, Pieridæ, etc. Coll. Ex. Buy. Sell.

Yano, Yukio, c/o Konodai High School, Konodai-machi, Ichikawa, Chiba Pref. RHOP. MACRO. Variation, Behavior. Coll. Ex.

PHILIPPINES

SUSON, F.M., 121 Bonifacio St., Cebu City. RHOP. Coll. Ex.

Uichanco, Leopoldo B. (Dr.), Dean of College, Laguana. RHOP. Distribution. Coll.

EUROPE

AUSTRIA

Klimesch, Joseph (Dr.), Linz a.d. Donau, Donatusgasse 4. LEPID: esp. *Nepticula, Coleophora,* and other miners. Life History, Genetics. Coll. Ex. Sell.

Wilcke, Hermann (Dr.), Kössen/Tyrol Nr. 199. RHOP. MACRO. esp. Noctuidæ, Geometridæ. Coll. Sell.

BELGIUM

Berger, Lucien, 2 Vallée des Artistes, Linkebeek-lez-Bruxelles. LEPID.

*Kiriakoff, S.G., Zoological Labs. Ghent University, 14 Universiteitsstraat, Ghent. RHOP: esp. Belgian Congo. MACRO: esp. Noctuoidea, Thyretidæ. MICRO: esp. Pyralididæ. Phylogeny, Classification. Ex.

CZECHOSLOVAKIA

Cejp, Karel (Prof.Dr.), Botanical Institut, Charles University, Benáska 2, Praha II. LEPID. Entomophytous fungi. Coll. Ex.

Chvála, pan Milan, Hořejší nábřezí 21, Praha 16. LEPID. of central Europe. Coll. Ex.

Kubelka, Vaclav. Na Strani 107/7, Prague XIII — Vrsovice. RHOP: Pieridæ. Coll. Ex.

Losenicky, Zdeněk, Chálenická 38, Plzen I. RHOP. MACRO. Coll. Ex.

Moucha, Josef, Národni Museum, Praha II.

Poláček, V.B., ul. Komenského, 601/I., Brandýs nad Labem. RHOP.

Povolný, Dalibor (Dr.), Instit. of Applied Entomology, Brno, Zemědělská 1. LEPID. of central Europe: esp. *Zygæna, Lithocolletis.* Coll. Ex.

DENMARK

Anderson, Axel, Odensegade 7, Ø, Copenhagen. Biology, Distributional Factors. Coll. Ex. Sell.

*Christensen, Georg, Parmagade 24, III, Copenhagen S. RHOP: esp. *Argynnis, Phyciodes, Erebia.* Genetics. Coll. Ex.

Hoffmeyer, Skat (Dr.), Bishop of Aarhus, Aarhus. LEPID. of northern Europe. Biology. Coll.

Langer, T.W., (Cand. Mag.), Horsholmsvej 77, Rungsted Kyst.

FINLAND

Hackman, Walter (Dr.), Parkgatan 5, Helsingfors. RHOP. and MACRO. of Scandinavia. MICRO. of Holarctic region, esp. Coleophoridæ, Gelechiidæ *(Phthorimæa).* Systematics, Distribution. Coll.

Kaisila, Jouko, Zoological Institute of University, P. Rautatiek. 13, Helsinki.

Krogerus, Harry (Dr.), Mannerheimvägen 25A, Helsingfors. LEPID: esp. Tortricidæ, and Canadian fauna. Coll. Ex.

Suomalainen, Esko (Prof.Dr.), Institute of Genetics, The University, P. Rautatiek. 13, Helsinki. LEPID. of Scandinavia. Genetics. Cytology.

FRANCE

Berjot, Etienne E., Villa "Pax", St. Martin de Crau, (Bouches du Rhone). RHOP. MACRO. Life History. Coll. Ex.

Bourgogne, Jean, Muséum d'Histoire Naturelle, 45 bis rue de Buffon, Paris 5^e. RHOP. MACRO: esp. Psychidæ (Palæarctic and African). Life History, Morphology, Biology. Coll. Ex.

deLesse, Hubert, Laboratoire d'Entomologie, 45 bis rue de Buffon, Paris 5^{e}. RHOP: esp. Nymphalidæ, Satyridæ *(Erebia)*. Coll. Ex.
Dujardin, F., 25 rue Guiglia, Nice (Alpes-Maritimes). Lycænidæ, Zygænidæ, Zoogeography. Coll. Ex.
Herbulot, Claude, 31 Ave. d'Eylau, Paris 16^{e}. MACRO: esp. Geometridæ. Coll. Ex. Buy.
LeCharles, Louis, 22 Avenue des Gobelins, Paris V. RHOP. MACRO: esp. Zygænidæ. MICRO: Crambidæ esp. *Crambus*. Biology. Coll. Ex.
Muspratt, Vera Molesworth (Mme.), Aïcé Choko St. Jean-de-Luz, Basses Pyrénées. RHOP. MACRO. Life History, Migration. Coll. Ex.
*Stempffer, Henri, 4 rue Saint Antoine, Paris 4^{e}. RHOP: esp. Lycænidæ (Holarctic and African). Coll. Ex.
Viette, Pierre E.L., Muséum Nat. d'Histoire Naturelle, 45 bis rue de Buffon, Paris 5^{e}. MICRO: esp. Homoneura (Micropterygidæ, Eriocraniidæ, Hepialidæ). ♂ genitalia. Coll. Ex.

GERMANY

Amsel, H.G. (Dr.), Karlsruhe/Baden, Landessammlungen für Naturkunde, Erbprinzenstr. 13.
Busch, Theo, (22b) Niederadenau, über Adenau/Eifel. RHOP. esp, *Melitæa*. Life History. Coll. Ex.
Cretschmar, Max (Dr.), Casselstr. 21, (20) Celle Hann.
Forster, Walter (Dr.), Menzingerstrasse 67, München 38, (American Zone). RHOP: esp. Lycænidæ. MACRO. Zoogeography. Coll. Ex.
Hering, Erich M. (Prof.Dr.), Berlin N.4, Invalidenstr. 43, Zoologisches Museum. MACRO: Pericopidæ, Zygænidæ, Dioptidæ, etc. MICRO: leaf-miners of all orders. Coll. Ex.
Hesselbarth, Gerhard, Oberstudiendirektor, 23 Quakenbrück Oberschule. Palaearctic RHOP.and MACRO: esp. Papilionidæ, Pieridæ, Bombyces, Arctiidæ. Life History, Zoogeography. Coll. Ex.
Jäckh, Eberhard, Haydn Platz 11, Bremen. LEPID: esp. Micros. Life History. Coll. Ex.
Kampf, Ari W., Franz Jurgens Strasse 12, Düsseldorf 10. RHOP. and MACRO: African, esp. *Cymothoe* and *Charaxes*. Coll. Ex. Buy. Sell.
Speyer, W. (Dr.), Kitzeberg ü. Kiel.
Warnecke, Georg (Landgerichtsdirektor), Hohenzollernring 32, Hamburg-Altona. Palæarctic RHOP. and MACRO: esp Geometridæ. Migration, Zoogeography. Coll

HUNGARY

Gozmány, Lancelot A. (Dr.), Széll Kálmán tar. 13, Budapest XII. MICRO. Helophil Moths. Coll. Ex. Sell.
Kovács, L. (Dr.), Budapest XII. Kléh István u 3/a. III. 1.
Lengyel, Julius F. (Dr.), Budapest II. Budakeszi ut 38. RHOP: of Europe, esp. *Melitæa*. MACRO: Noctuidæ, esp. *Cucullia*. Distribution, Zoogeography. Coll. Ex.

ITALY

Berio, E. (Dr.), Museo di Storia Naturale, Via Brigata Liguria 9, Genova. MACRO: esp. Noctuidæ. Coll. Ex. Buy.
Hartig, Fred (Pr. Count), Sovrint. Istituto Nazionale di Entomologia, Via Catone 34, Rome.
Parodi, Guiseppe, Via Sebenico 13, Milano.
Verity, Roger R. (Dr.), Caldine (Firenze). RHOP: esp. Palearctic. Coll. Ex. Buy.

MALTA

Valletta, Anthony, 257 Msida St. B, B'Kara. RHOP: esp. Satyridæ and Nymphalidæ. MACRO. MICRO. Coll. Ex.

NETHERLANDS

Diakonoff, A. (Dr.), Rijksmuseum van Natuurijke Historie, Leiden. MICRO: all except Pyralidoidea. Leaf-miners, Biology, Morphology. Coll. Ex. Buy.
Eisner, Curt, 5, Kwekerijweg (The Hague). *Parnassius*. Coll.
Lempke, B.J., Oude Yselstraat 12^{II}, Amsterdam Z-2. RHOP. and MACRO. of Netherlands. Life History.
Roepke, W. (Prof.Dr.), Lab. voor Entomologie, Berg 37, Wageningen. RHOP. and MACRO: esp. Palæarctic and Indomalayan. Life History, Ecology, Genetics, Morphology, Histology, Zoogeography, Systematics.

Straatman, Raymond, 127 Malakkastraat, Den Haag. RHOP. MACRO. Life History, Foodplants, Literature on Indonesian Lepid.

PORTUGAL

da Silva Cruz, Maria A., Quinta de S. João, Candal, Vila Nova de Gaia. RHOP: esp. *Melitæa.* MACRO: esp. Geometridæ. Migration. Coll. Ex.

SPAIN

Agenjo, Ramon, Instituto Español de Entomología, Palacio del Hipódromo, Madrid. LEPID. of Spain. Coll.

Torres Sala, Juan, 1 Calle Dr. Romagosa, Valencia. Palearctic RHOP., World Papilionidæ, Nymphalidæ, Morphidæ. Palearctic MACRO., World Saturniidæ, Uraniidæ, Castniidæ. Life History. Coll. Ex. Buy.

SWEDEN

Bryk, Felix, Riksmuseum, Stockholm 50. RHOP. Nervature, Morphology. MACRO.

Nordström, Frithiof (Dr.), Kungsholmstorg 1, Stockholm. MACRO: esp. Agrotidæ, *Eupithecia.* Life History. Coll.

SWITZERLAND

Lüthi, Adrian J., Inneres Sommerhaus, Burgdorf. RHOP. MACRO: esp. Sphingidæ. Coll. Ex. Buy. Sell.

Ruetimeyer, Ernest, 38 Rue Fédérale, Berne. RHOP. and MACRO: esp. Papilionidæ, Pieridæ, Danaidæ, Satyridæ, Noctuidæ. Coll. Ex.

UNITED KINGDOM

ENGLAND

Bowden, S.R., 53 Crouch Hall Lane., Redbourn, St. Albans, Herts. RHOP.: esp. *Pieris* genetics. Coll. Ex.

Clarke, C.A., (Dr.), "High Close", Thorsway, Caldy, Cheshire. *Papilio* hybridisation.

*Ford, E.B. (Dr.), University Museum, Oxford. LEPI. Genetics. Coll.

Hards, Charles H., 40 Riverdale Road, Plumstead, London, S.E. 18. English and American RHOP. and MACRO: esp. *Catocala,* Saturniidæ. Life History, Mirgation, Distribution, Variation. Coll. Ex.

Heley, Robert G., "Lygoes", Burcott, Wing, Leighton Buzzard, Beds. RHOP: of world, esp. Pieridæ, Nymphalidæ, Papilionidæ. MACRO: esp. Saturniidæ. Distribution, Mimicry. Coll. Ex. Buy. Sell.

Hemming, Francis, 28 Park Village East, Regent's Park, London N.W. 1. RHOP: esp. Palæarctic and Nearctic. Coll. Ex. Buy.

Hinton, H.E., (Dr.), Dept. of Zoology, University of Bristol, Bristol. Phylogeny, Physiology. Coll. (larvæ).

Jacobs, S.N.A., 54 Hayes Lane, Bromley, Kent.

*Riley, Norman D., 7 McKay Road, London S.W. 20. RHOP.

†SMITH, P. SIVITER, 21 Melville Hall, Holly Road, Edgbaston, Birmingham 16. RHOP: esp. *Lycæna.* Coll. Ex. Buy.

TAMS, W.H.T., Dept of Entomology, British Museum (Nat. Hist.), Cromwell Road, London, S.W. 7. MACRO: esp. Lasiocampidæ, Agrotidæ. MICRO: esp. Pyralididæ, Tinæidæ. Life History.

Warren, Brisbane C.S., 3 Augusta Mansions, Folkestone, Kent. RHOP: esp. Satyridæ, Nymphalidæ. Life History, Distribution. Coll.

Wiltshire, E.P., Esq., c/o Records Section, Foreign Office, 8 Carlton House Terrace, London S.W. 1.

Wyatt, Colin W., Cobbetts, Farnham, Surrey. RHOP: esp. Alpine and Arctic spp., Palæarctic and Nearctic. Local races. Coll. Ex. Sell.

SCOTLAND

MacFarlane, 50 Roslea Drive, Dennistoun, Glasgow.

Williams, C.B. (Dr.), Ardinsh Kincraig, Inverness-shire. Migration, Populations, Ecology. Coll. Ex.

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†Life Member.

YUGOSLAVIA

Lorković, Z. (Prof.Dr.), Medical Faculty, Zagrebian University, Zagreb.

LATIN AMERICA

ARGENTINA

Bourquin, Fernando F., Calle Conde 1639, Buenos Aires. LEPID: Life History only. Coll.

Breyer, Alberto, Maipu 267, Buenos Aires. RHOP. and MACRO: Argentine only. Coll.

Hayward, Kenneth J. (Prof.), Miguel Lillo 205, Tucumán. RHOP.: Neotropical (esp. Argentine) and Hesperiidæ.

Orfila, Ricardo N. (Dr.), Casilla Correo 2.-Suc.28, Buenos Aires. Neotropical LEPID: esp. Noctuidæ, Tortricoidea. Coll. Ex.

Pastrana, José A., Solis 370, Buenos Aires. MICRO: esp. Pyralidoidea, Tortricoidea. Coll. Ex.

Yivoff, León, Bouchard 1840, Adrogué, F. C. Grl. Roca, (Prov. Bs. Aires).

BRAZIL

*Araujo, R.L. (Dr.), Instituto Biológico, Caixa Postal 7.119, São Paulo, S.P. MACRO: esp. Castniidæ, Dalceridæ. Coll. Buy.

d'Almeida, Remualdo F. (Dr.), Rua Viana Junier, 25 Encantado, Rio de Janeiro, D.F. RHOP: esp. Ithomiinæ, Pieridæ, Papilionidæ. MACRO: esp. Syntomidæ, Arctiidæ, Sphingidæ, Saturnioidæ. Biology. Coll. Ex. Buy.

de Biezanko, C.M. (Prof.Dr.), Caixa postal 15, Palacio do Comercio apto. 501, Pelótas, Rio Grande do Sul.

Cardoso, Aldo (Dr.), Avenida Teresa Cristina 65, Maceió, Alagoas. LEPID. of the world, esp. Saturnioidea. Ex.

Ebert, Heinz (Dr.), Avenida Pasteur 404, Commissão National da Producão Mineral, Rio de Janeiro. RHOP: Theclinæ and Riodinidæ of world; neotropical Limenitinæ, Charaxinæ, Apaturinæ, Satyridæ. Fauna of Brazil. Ex. Buy.

Kesselring, Jorge, Caixa Postal 6, João Pessoa, (Paraíba). RHOP. MACRO. Life History. Coll. Ex. Buy. Sell.

Oiticia F°., José (Dr.), Rua Alfredo Chaves 59, Rio de Janeiro. RHOP. MACRO: esp. Sphingidæ, Saturniidæ. Morphology. Coll. Ex. Buy.

PEARSON, HENRY R., Caixa Postal 5151, Rio de Janeiro. RHOP: esp. Nearctic Papilionidæ. MACRO: esp. Saturniidæ, Sphingidæ, Mimallonidæ. Life History, Food Plants, etc. Coll. Ex. Buy.

Travassos, Lauro (Prof.), Instituto Oswaldo Cruz, Laboratório de Helmintologia, Caixa Postal 926, Rio de Janeiro, D.F. MACRO: esp. Arctiidæ, Adelocephalidæ. Coll. Ex.

Travassos F°., Lauro (Dr.), Dept. Zoologia, Secr. da Agricultura, Caixa Postal 7172, São Paulo. MACRO: esp. Ctenuchidæ, Pericopidæ, Castniidæ. Life History. Coll. Ex.

BRITISH WEST INDIES

Bellinger, Peter F. (Dr.), University College of the West Indies, Mona, St. Andrew, Jamaica. LEPID. Coloration, Genetics. Coll. Ex.

Lewis, C. Bernard, Science Museum, Institute of Jamaica, Kingston, Jamaica. RHOP: esp. of Jamaica and Cayman Island. Coll.

Perkins, Lilly G., Sunnybank, Claremont, St. Ann, Jamaica. RHOP. MACRO: esp. Sphingidæ. Sell.

CHILE

Herrera González, José (Prof.), Lo Ovalle 0195, Santiago. RHOP: esp. Pieridæ, Nymphalidæ, Satyridæ. Genitalia, Genetics. Coll. Ex.

CUBA

de la Torre y Callejas, S.L. (Dr.), Universidad de Oriente, Santiago de Cuba, Oriente. RHOP: esp. *Eurema.* Coll. Ex.

MEXICO

Escalante, Tarsicio (Dr.), Av. Cuitahuac 63, Mexico 17, D.F.

Vasquez G., Leonila (Dra. Miss), Instituto de Biologia, Casa del Lago de Chapultepec, Mexico, D.F. RHOP. Life History.

Welling, Edward C., La Casa Victoria, Chichén Itzá, Yucatán. RHOP. MACRO. Coll. Sell.

Williams, Jorge V., Hotel Los Lagos, Comitan, Chiapas. Sell.

VENEZUELA

Lichy, René (Prof.), Edifico ENKA, Apto. 17, Avenida Fermin Toro, San Bernardino, Caracas. RHOP: Venezuelan only, esp. *Eurema.* MACRO: esp. Sphingidæ of the world. Zoogeography, Ecology. Coll Ex. Buy.

NORTH AMERICA

CANADA

ALBERTA

McGuffin, W.C. (Dr.), Forest Zoology Lab., 402 Customs Bldgs., Calgary.

BRITISH COLUMBIA

*Fitch, Richard J., 2235 Pandora St., Vancouver. Arctic LEPID. Sell.

*Guppy, Richard, R.R. 1, Marine Drive, Wellington. RHOP. MACRO. Coll. Sell. Rear.

MANITOBA

Bird, Charles D., 1930 Rosser Ave., Brandon. RHOP: esp. Satyridæ. MACRO. Coll. Ex. Sell.

Polusny, John, 641 Martin Ave., Winnipeg. RHOP. MACRO. esp. Nearctic. Coll Ex. Sell.

*Quelch, C.S., Transcona. LEPID: esp. Central and S. American. RHOP. Coll. Ex.

NOVA SCOTIA

*Ferguson, Douglas C., Nova Scotia Museum of Science, Halifax. RHOP: Nearctic. MACRO: Nearctic, esp. Geometridæ, Noctuidæ. Coll. Ex. Buy.

ONTARIO

Bailey, Earl G., 34 Tecumseh St., St. Catharines, RHOP. MACRO. Coll.

*BRUGGEMANN, Paul F., 335 Science Service Bldg., Ottawa. RHOP. MACRO: esp. Geometridæ, Hepialidæ. Life History. Coll. Ex. Sell.

Durden, Christopher J., 840 Rex Ave., Ottawa 3. RHOP. Bog-dwellers. Life History. Coll. Ex.

*Freeman, Thomas N. (Dr.), Div. of Entomology, Science Service Bldg., Ottawa. RHOP: esp. of Arctic. MICRO. Coll. Rear.

*Hardwick, David F., Div. of Entomology, Science Service Bldg., Ottawa. MACRO: esp. Noctuidæ. Coll. Ex. Buy. Rear.

Harrington, Peter T., 88 Heddington Ave., Toronto. RHOP: Papilionoidea of N. Amer.; Papilionidæ, Danaidæ and Heliconiidæ of world. Coll. Ex. Buy. Rear.

Johnson, James H., Bridgenorth (nr. Peterborough). RHOP. Life History. Coll.

Lambert, Robert (Dr.), Systematic Entomology, Science Service, Ottwawa. MICRO: esp. Tortricidæ. Forest Lepidoptera. Biology. Coll.

McKay, Margaret (Miss), Div. of Entomology, Science Service Bldg., Ottawa. LEPID. larvæ.

*Munroe, Eugene G. (Dr.), Div. of Entomology, Science Service Bldg., Ottawa. RHOP. MACRO. MICRO: esp. Pyralididæ and related families. Coll. Ex. Buy. Rear.

Reiter, Raymond, 851 Manning Ave., Toronto 4, RHOP: esp. Papilionidæ, Nymphalidæ. esp. *Catocala,* Saturniidæ. MACRO: Coll. Ex. Buy. Sell. Rear.

Riotte, J.C.E. (Rev.), Box 536, Geraldton. Holarctic Sphingidæ. All LEPID. of N.W. Ontario. Coll. Rear.

Syme, Paul D., 262 Bessborough Drive, Toronto 17. LEPID., esp Ontario. Coll. Ex.

*Vogel, Harold A., 11 Geary Ave., S.S.#3, London. RHOP. MACRO. Coll.

Winters, John R.R. 4, Embro. RHOP. MACRO. Systematics, Nomenclature. Coll. Ex. Buy. Sell.

Wood, D.M., 7 Dale Ave., Toronto. LEPID. Dipterous parasites. Coll. Ex.

QUEBEC

*Adelphe, (Rev. Brother), École Secondaire Richard, 1100 rue Rielle, Verdun. RHOP: esp. of eastern Canada. MACRO: esp. Noctuidæ of eastern Canada. Coll.

*GRAY, P.H.H. (Dr.), Box 236, Macdonald College. Local LEPID. Biology. Coll.
Hensel, Henry, 2373 St. Zotique St., East Montreal. RHOP: esp. *Papilio, Colias, Limenitis, Danaus.* Coll. Ex. Buy.
*Robert, John H., 11 Westwood Drive, Pointe Claire. Pieridæ. Coll. Ex. Buy.
*Sheppard, Arthur C., 5554 Coolbrook Ave., Montreal 29. LEPID: of Quebec only. Coll. Ex. Sell. Rear.

SASKATCHEWAN

SHAW, J.P., Box 1056, Weyburn. RHOP. MACRO. esp. Saturniidæ. Coll. Buy. Rear.

UNITED STATES OF AMERICA

ALABAMA

*Chermock, Ralph L. (Dr.), Box 2047, University of Alabama, University. RHOP: esp. Satyridæ. Taxonomy. Coll.
KNUDSEN, JOHN P., 1304 11th St., S.E., Decatur. RHOP: esp. Papilionidæ. MACRO: esp. Saturniidæ. Hybridization. Coll. Ex. Rear.

ARIZONA

Werner, Floyd G. (Dr.), Dept. of Entomology, University of Arizona, Tucson. MACRO. & MICRO. of Arizona. Coll. (Determinations needed).

CALIFORNIA

Baber, Donald L., 1511 Drake Ave., Burlingame. RHOP: esp. Neotropical Papilionidæ, Nymphalidæ. Coll. Ex.
Baker, Nelson W., 279 Sherwood Drive, Santa Barbara.
*Bauer, William R., 235 Liberty St., Petaluma. MACRO: esp. Noctuidæ, Geometridæ. Coll. Ex.
Blackman, Thomas M., 11669 Yorba Ave., Chino. RHOP. MACRO. Coll. Ex. Rear.
Braviroff, Harry, 1170 "E" St., San Bernardino. LEPID. esp. exotic. uy.
Buckett, Steve, 148 Belleview Ave., Petaluma. MACRO: esp. Noctuidæ, Geometridæ. Coll. Ex.
Burdick, William N., 1108 S. Harvard Blvd., Los Angeles 6. RHOP of Rocky Mts. and West only. Coll. Ex. Buy.
Clayton, Roderick K. (Dr.), Dept. of Physics, U.S. Naval Postgraduate School, Monterey. RHOP. MACRO. Genetics and physiology. Coll. Ex. Buy.
*Comstock, John A. (Dr.), P.O. Box 158, Del Mar. LEPID. Life History. Rear.
*Davies, Thomas W., 791 Elsie Ave., San Leandro. RHOP. MACRO. Coll. Ex. Buy. Sell.
*Downey, John C., Zoology Dept., University of Calif., Davis. RHOP: esp. Lycænidæ. Coll. Ex.
*Evans, William H., 8711 La Tuna Canyon Road, Sun Valley. RHOP MACRO: esp. *Annaphila,* Heliothiinæ. Life History, Photography. Coll. Sell. Rear.
*Ford, Robert J., 3266 Ardmore Ave., South Gate. LEPID. esp. Riodinidæ, Lycænidæ, Arctiidæ, Zygænoidea, Pyralidoidea. Coll. Ex. Rear.
Freeman, Walter H., Rt. #3, Academy, Box 190, Camarillo. RHOP. MACRO. Coll. Ex. Rear.
Gehrhardt, Edgar E., 456 18th St., Richmond 5. RHOP. MACRO: esp. Sphingidæ. Coll. Ex. Buy.
Gemignani, Carlo, 428 Birch St., Redwood City. MACRO. MICRO. Coll. Rear.
*Hammer, William A., 1923 Evergreen Ave., San Leandro. RHOP: esp. *Speyeria, Colias, Œneis.* MACRO. Coll. Ex. Buy.
HARLICK, ROBERT M., 2159 33rd Ave., San Francisco 16.
Hill, Charles, 1350 San Luis Rey Drive, Glendale 8. MACRO: esp. Noctuidæ of western Nearctic region. Coll. Ex. Buy.
*Hovanitz, William (Prof.), Dept. of Zoology, University of Calif., Los Angeles. RHOP. Genetics, Geographical Variation.
*Hulbirt, Lowell H., 622 N. Bright Ave., Whittier. RHOP: esp. Lycænidæ, Hesperiidæ. Coll. Ex.
Kimura, Michio G., (DAC), 500th MIG, Strategic Branch, APO 613, San Francisco. RHOP: esp. *Papilio, Lühdorfia, Eurema.* Life History, Aberrations. Coll. Ex. Buy.
*KIRKWOOD, CARL W., Box 47, Summerland. MACRO. esp. Geometridæ. Coll. Ex. Buy.
La Due, Noel L., 1712 41st St., Sacramento 19. LEPID: esp. *Zerene.* Coll. Ex.

Lange, W. Harry (Dr.), Dept. Entomology, University of California, Davis. MICRO: esp. Pterophoridæ and aquatic Pyralididæ. Coll. Ex. Buy.

Langston, Robert L., 3 Arlington Ave., Berkeley 5. RHOP. MACRO of western Nearctic. MICRO: esp. Zygænoidea. Coll. Ex. Rear.

Laspe, Charles G., 1 Middleridge Lane No., Rolling Hills. RHOP: esp. Papilionidæ. Coll. Ex.

Linsdale, Donald D., Carmel Valley. RHOP. MACRO. Coll.

McAvoy, Thomas F. Jr., Hoopa Sub-Agency, Hoopa. RHOP. Coll. Ex. Buy. Sell.

McFarland, A. Noel, 9601 Oak Pass Road, Beverly Hills. RHOP. MACRO. Coll. Ex. Buy.

Macheboeuf, Charles, Kelseyville. RHOP. MACRO. Coll. Ex. Buy. Sell. Rear.

McBurney, John T. (Dr.), 1224 E. Wilhelmina, Anaheim. RHOP. Coll. Ex.

*McHENRY, PADDY, 1032 E. Santa Anita, Burbank. Original Descriptions and their Publication Dates. Coll.

McKenney, Marvin J., 4114 Rochester Rd., San Diego 16. RHOP: esp. Theclinæ. Coll. Ex.

MacNeill, C. Don, Dept. of Entomology, 112 Agriculture Hall, University of California, Berkeley 4. RHOP. esp. Hesperioidea. Coll. Ex. Buy.

*Martin, Lloyd M., Los Angeles County Museum, Exposition Park, Los Angeles 7. Southwestern LEPID: esp. Acontiinæ, Notodontidæ, Hesperioidea. Coll. Ex. Rear.

*Mattoni, R.H.T., Dept., of Botany, University of California, Los Angeles 24. RHOP: esp. Glaucopsychinæ of the world. Coll. Ex. Buy.

Minahan, Roger P., 8372 E. Westminster Ave., Westminster. LEPID: esp. moths. Ecology, Genetics, Life History, Parasitology.

Moore, Eric, 7033 Santa Fe Ave., Huntington Park. RHOP. Ex. Buy.

Neumann, D., Jr., 3066 Georgia St., Oakland 2. Literature. Sell.

Opler, Paul A., 415 Beatrice Rd., Pleasant Hill. RHOP: esp. *Speyeria, Papilo, Apodemia, Lycæna.* MACRO. Coll. Ex. Rear.

†OWEN, WILFERD D., 437 F.I.S., Oxnard A.F.B., Oxnard. RHOP: esp. *Colias.* Life History. Coll. Ex.

PATTERSON, DONALD, 170 Glenwood Ave., Atherton. RHOP. Coll.

*Pickel, Benjamin H., 10532 Andasol Ave., Granada Hills. RHOP: esp. Theclinæ. Migration. Ex. Buy. Sell.

Powell, Jerry A., 4811 East Alder Drive, San Diego 16. Southern and Lower Calif. RHOP. Coll. Ex. Sell.

Pronin, George F., 516 Cole St., San Francisco 17.

Rees, William A., 934 So. McDonnell Ave., Los Angeles 22, MACRO: esp. *Euxoa, Oncocnemis, Zale.* MICRO. Coll. Ex. Buy. Sell.

Reichart, George B., 5929 Wood Drive, Oakland 11, RHOP: esp. *Euphydryas, Melitæa,* Pieridæ; Boreal and Alpine. Coll. Ex. Rear.

*Reid, Robert H., 4442 Franklin Ave., Los Angeles 2. RHOP: esp. Plebeiinæ. MACRO: esp. Heliothiinæ *(Schinia).*

*Roberds, Joseph, 2022 Huntington Lane, Redondo Beach. RHOP: esp. *Papilio.* MACRO: esp. Saturniidæ, esp. of Mexico, Cent. & S. Amer. Coll. Ex. Buy. Rear.

Rubbert, Allen, 1915 Terrace Way, Bakersfield. RHOP: esp. *Speyeria, Plebejus,* Pieridæ of southern Calif. Coll.

Sala, Frank P., 1912 Hilton Drive, Burbank. RHOP. MACRO: esp. Saturniidæ, *Catocala,* Noctuidæ. MICRO: esp. Ægeriidæ, Cossidæ. Life History. Coll. Ex. Sell.

Samuelson, G. Allan, 3824 Walnut Ave., Concord. Nearctic RHOP. and MICRO. Coll. Ex. Rear.

Schmela, Dora E. (Mrs.) 2883 Grove St., Ventura. RHOP. Coll.

SETTE, OSCAR E., 23645 Arbor Ave., Los Altos.

Smith, Arthur C., P.O. Box 411, Berkeley. RHOP. and MACRO. of Mexico and Southern U.S.A. Ecology, Distribution. Coll. Ex. Buy. Sell.

Spencer, John C., 13040 Evanston St., Los Angeles 49. RHOP. Coll. Ex.

Steinhoff, Gordon R., 3916 Oak St., Burbank. RHOP. Coll. Ex. Buy.

Stoner, Emerson A., 285 East "L" St., Benicia. RHOP. Coll. Ex.

*THORNE, FRED T., 1360 Merritt Drive, El Cajon. RHOP: esp. Theclinæ. Ecology—southwestern states. Coll. Ex. Rear.

*Tilden, J.W. (Dr.), 125 Cedar Lane, San Jose 27. RHOP: esp. Hesperiidæ, Lycænidæ. MICRO. Ecology. Coll. Ex. Rear.

Wilson, Patrick R., 434 Webster St., San Francisco. RHOP: esp. Calif. *Papilio.* Coll. Ex.

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†Life Member.

COLORADO

*Brown, F. Martin, Fountain Valley School, Colorado Springs. RHOP: esp. Pieridæ and Satyridæ of neotropics. Distribution. Coll. Ex. Buy.
*Eff, J. Donald, 820 Grant St., Boulder. RHOP: esp. *Melitæa, Euphydryas,* and Arctic species. Coll. Ex. Sell.
Jae, Raymond J., 1286 So. Umatilla St., Denver. RHOP: esp. *Thecla, Neozephyrus, Strymon* of world. Coll. Ex.
MARSTON, NORMAN L., Hartman. LEPID: esp. Arctiidæ, *Acronycta, Erynnis.* Genitalia. Coll. Ex.
Minor, W.C., P.O. Box 62, Fruita. RHOP: esp. Rocky Mt. fauna. MACRO. Coll. Ex. Buy. Sell.
*Renk, John J. (Brother), Regis College, W. 50th and Lowell Blvd., Denver 11 RHOP: esp. Lycænidæ. Coll. Ex.
Rotger, Bernard (Rev.), Pagosa Springs. RHOP: esp. of Colorado. MACRO. Coll. Ex. Buy. Sell.

CONNECTICUT

Austin, George T., 99 May St., New Britain. RHOP. MACRO. Coll.
Bakeless, John (Dr.), Great Hill. Seymour. RHOP. of Northeastern U.S. Coll.
Beall, Geoffrey (Dr.), Dept. of Mathematics, University of Connecticut, Storrs. RHOP. Migration.
Brower, Lincoln P. & Jane VZ., Osborn Zoological Lab., Yale University, New Haven 11. Biol. of Lepid. Mimicry. Coll.
Courtsis, John G., Yale Station, New Haven 11. RHOP: esp. of Greece and West Indies. Coll. Ex. Rear.
Hartman, W.D. (Dr.), Peabody Museum of Natural History, Yale University, New Haven 11, RHOP.
*HESSEL, SIDNEY A., Nettleton Hollow Rd., Washington. RHOP. MACRO: esp. *Papaipema, Catocala.* Coll. Rear.
Muhonen, Daniel P., 1637 Yale Station, New Haven. RHOP. MACRO. Ex.
Pease, Roger W., Jr., 6 Trumbull St., New Britain. RHOP. MACRO. of U.S., Korea, Japan. Coll. Ex. Rear.
*Remington, Charles L. (Prof. & Mrs.), Osborn Zool. Lab., Yale University, New Haven 11. LEPID: esp. *Colias, Limenitis, Papilio.* Genetics, Mimicry, Phylogeny. Larvæ, Pupæ. Coll. Ex. Buy. Rear.
*Schroeter, Otto H., P.O. Box 391, Quaker Hill. RHOP. MACRO: esp. Indo-Australian and So. Amer. Saturniid . Coll. Buy. Sell. Rear.
*Wilhelm, Herman P., Buckingham Rd., Willimantic. RHOP. MACRO. Coll. Ex. Buy. Sell.

DELAWARE

JONES, FRANK MORTON (Dr.), 2000 Riverview Ave., Wilmington. LEPID: esp. Psychidæ. Coll. Ex. Buy.

DISTRICT OF COLUMBIA

Capps, H.W., Room 391, U.S. National Museum, Washington 25. Larvæ of LEPID. Pyraustidæ adults.

FLORIDA

DAVIDSON, W.M., 1504 Bodell St., Orlando. RHOP: esp. Hesperiidæ, Lycænidæ, Pieridæ. MACRO. Coll. Ex. Rear.
du Brucq, W.J., 157 Lenape Drive, Miami Springs. RHOP. Coll. Ex. Buy. Sell.
*Fuller, Stanley V., Box 81, Cassadaga. RHOP. MACRO: esp. Sphingidæ and Catocalinæ. Life History. Coll. Rear.
Harris, Lucien III, 2100 West Amelia, Orlando.
*KIMBALL, CHARLES P., Route 4, Box 942, Sarasota. LEPID: esp. Micros. Coll. Ex.
*King, H.L., Box 1171, Sarasota. RHOP: esp. Theclinæ. Coll. Ex.
Klein, John D., 316 DeSoto Circle, Orlando. Papilionidæ. Coll. Ex. Buy. Sell.
Monroe, Burt L. (Lt.j.g.), BTU-1-S NAAS Whiting Field, Milton. RHOP. MACRO. Coll. Ex.
Stein, George L., 262 Capri Ave., Lauderdale-by-the-Sea. RHOP. MACRO. Life History. Distribution. Coll. Ex. Buy. Sell.
Sweetman, Harry E., Box 518, DeBary. RHOP. and MACRO: esp. of central northwest U.S.A. Life History. Coll. Ex. Buy. Sell.

GEORGIA

*Harris, Lucien, Jr., P.O. Box 167, Avondale Estates. RHOP. MACRO. Coll.

NAUMANN, FRED T., P.O. Box 226, Forsyth. MACRO. Life History. Coll. Rear. Buy. Sell. Ex.

*Towers, Abner A., 2421 Sagamore Drive N.W., Atlanta. RHOP. and MACRO: Nearctic only. Coll. Ex.

HAWAII

*Calkins, Virgil F., P.O. Box 461, U.S. Immigration-Naturalization Service, Honolulu 9, Oahu. RHOP: Nearctic. MACRO: esp. Saturniidæ, Sphingidæ, Ceratocampidæ, *Catocala.* Coll. Buy. Sell.

IDAHO

Manning, James H., 1515 N. 26th, Boise. RHOP.

ILLINOIS

ALLYN, A.C., Jr., 1201 Sheridan Rd., Evanston. RHOP: esp. *Charaxes, Papilio, Morpho.* Coll. Ex. Buy.

ANHILGER, CARL, 5938 W. Chicago Ave., Chicago 51. RHOP: esp. *Papilio, Troides* (=*Ornithoptera*), etc. Coll. Ex. Buy.

Arbogast, Richard T., 1216 S. High Ave., Freeport. RHOP. MACRO. Coll. Ex. Buy. Rear.

Brady, Thomas G., 38 S. Dearborn St., Chicago 3. RHOP. Coll.

*Bristol, Maurice L., 511 May St., Elgin. RHOP: esp. *Thecla.* MACRO: esp. *Apantesis, Catocala,* Noctuidæ. Coll. Buy. Rear.

Conway, Patrick J., R.R. #3, Box 127, Aledo. RHOP: esp. Satyridæ, *Speyeria, Boloria, Melitæa, Euphydryas.* Coll. Ex. Rear.

Crowder, George L., 913 S. Hamilton, Marissa. Neotropical RHOP: esp. Papilionidæ. MACRO. Coll. Buy. Rear.

Dluhy, Eugene, 3912 N. Hamilton Ave., Chicago 18. RHOP: esp. *Papilio.* MACRO: esp. Saturniidæ. Coll. Ex. Buy. Sell. Rear.

Fryxell, Thomas, 1331 42nd Ave., Rock Island. RHOP. Coll. Ex.

Fulton, MacDonald (Dr.), Dept. of Bacteriology, Loyola School of Medicine, 706 S. Wolcott Ave., Chicago 12. RHOP. Coll. Ex.

*Gerhard, W.J., Curator of Insects, Chicago Natural History Museum, Chicago 5. RHOP. MACRO.

*GLENN, MURRAY O., 1019 Normal St., Henry. MACRO. MICRO. Coll. Ex. Buy. Rear.

Grinnell, Alan D., 1109 W. Hill St., Carbondale. Geometridæ. Coll.

Hagey, Robert H., 2400 Greenwood Ave., Wilmette. LEPID. Coll.

Hayes, Joseph B., 522 Forest Preserve Drive, Chicago 34. RHOP: esp. Papilionidæ. MACRO: esp. *Catocala,* Saturniidæ. Coll. Ex. Buy. Sell. Rear.

*Irwin, Roderick R., 411 N. Bloomington St., Streator. RHOP. Coll. Ex. Buy.

Jelinek, Anton, 3900 Diversey Ave., Chicago 47. RHOP: esp. *Morpho.* Ex. Buy. Sell.

Karalus, Karl E., 10411 Diversey Ave., Melrose Park. RHOP: esp. *Troides, Papilio, Agrias.* MACRO. Indo-Australia, Africa. Coll. Ex. Buy. Rear.

Kistner, David H., Dept. of Zoology, University of Chicago, Chicago 37. Speciation and Zoogeography.

LEUSCHNER, RONALD, 1172 S. Wenonah Ave., Oak Park. RHOP. MACRO: esp. Noctuidæ, Geometridæ. Coll. Ex. Buy.

Lussenhop, John, 730 N. Harvey, Oak Park. RHOP. Coll. Buy.

Makinson, George L., 7508 S. May St., Chicago 20. RHOP: esp. Papilionidæ. MACRO: esp. Sphingidæ, Saturniidæ. Indo-Malayan. Coll. Buy. Rear.

MERRIAM, Elsey E. (Miss), 4520 Clarendon Ave., Chicago 40.

Morris, Mike, 1365 East 60th St., Chicago 37.

*NICOLAY, S.S. (Lt.Col.), 1164 Phingsten Rd., Northbrook. RHOP: esp. Lycænidæ, Hesperiidæ. Coll. Ex. Buy.

Oemick, Donald, 11022 Vernon Ave., Chicago 28. RHOP: esp. *Papilio.* MACRO: esp. *Catocala.* Coll. Ex. Buy. Rear.

Phillips, Leonard S., Armour Research Foundation of Ill. Institute of Technology, Biochemistry Dept., 35 W. 33rd St., Chicago 16. RHOP: esp. *Precis, Limenitis.* MACRO: esp. *Catocala.* Coll. Ex. Buy. Sell.

*Schoenherr, William H., 225 Cedar Ave., Danville. RHOP: esp. Pieridæ, *Papilio.* MACRO: esp. Sphingidæ. Coll. Ex. Buy. Rear.
SICHER, HARRY (Dr.), Loyola University School of Dentistry, 1757 W. Harrison St., Chicago 12. RHOP. Coll.
Smalley, B.L., Jr., 8940 S. Bell. Ave., Chicago 20. RHOP: esp. Papilionidæ. MACRO: esp. Saturniidæ. Coll. Buy.
Steffen, Michael K., 124 N. Foley Ave., Freeport. RHOP: esp. Nymphalidæ, *papilio,* Hesperiidæ. MACRO. Aberrations. Coll. Ex. Buy.
Turner, Blair H., 1575 Ashland Ave., Evanston. RHOP: esp. Lycænidæ. Coll. Buy. Rear.
*WOODCOCK, H.E., 6115 Newport Ave., Chicago 34. MACRO. MICRO. Coll. Ex. Buy.
*Wyatt, Alex K., 5842 N. Kirby Ave., Chicago 30. RHOP. MARCO: esp. *Eubaphe, Papaipema,* Heliothiinæ. Coll. Ex. Rear.

INDIANA

Aé, Albert, Dept. of Biology, University of Notre Dame, Notre Dame. RHOP: Genetics. Coll.
BADGER, F. SIDNEY, 209 Forest Drive, Kokomo. RHOP. MACRO. Coll. Ex.
Shields, James E., 503 West Sixth St., Marion. RHOP: esp. Papilionidea. Coll. Ex. Rear.
*Young, Frank N. (Prof.), Dept. of Zoology, Indiana University, Bloomington. Rhop. esp. So. Florida. Coll.

IOWA

Booth, Oliver E., 907 Clinton Ave., Des Moines 13. RHOP. esp. Papilionidæ. Coll. Ex. Buy. Rear.

KANSAS

Bancroft, Larry, 1023 S. Main, Ottawa. LEPID. Coll. Ex. Buy.
Davis, Don, 1404 Alumni Pl., Lawrence.
*Ehrlich, Paul R., Dept. of Entomology, University of Kansas, Lawrence. RHOP: Satyridæ, esp. *Erebia.* Coll. Ex. Buy.
Howe, William H., 822 E. Eleventh St., Ottawa. RHOP: esp. *Papilio, Troides, Morpho.* MACRO: esp. Sphingidæ, Saturniidæ, *Catocala.* Coll. Ex. Buy.
PRESTON, FLOYD W., RFD #2, Lawrence. RHOP: esp. Pieridæ. Coll. Ex.
PRESTON, JUNE D., RFD #2, Lawrence. RHOP: esp. Lycænidæ. Coll. Ex.
*STALLINGS, DON B., Caldwell. RHOP: esp. *Megathymus.* Speciation. Coll. Ex. Buy. Rear.
Turner, R.C., (Dr.), Caldwell. RHOP. esp. *Megathymus* Life History. Coll. Rear.

KENTUCKY

*Beebe, Ralph, Renfro Valley. MICRO. Coll. Ex.
*Bishop, John A. (Dr.), Jeffersontown. RHOP. Coll. Ex.
*Cook, Carl, Crailhope. Papilionidæ of the world. Coll. Ex. Buy. Sell. Rear.
Merritt, James R. (Prof.), School of Law, University of Louisville, Louisville 8. RHOP. MACRO. Coll. Ex. Buy. Rear.
Unseld, James M., Jr., Gravel Switch. RHOP: esp. *Papilio,* MACRO. Coll. Ex. Buy. Sell. Rear.

LOUISIANA

Berg, George H., Room 319, Custom House, New Orleans 16. RHOP: esp. Papilionidæ of world. Coll. Ex. Buy.

MAINE

*BROWER, A.E. (Dr.), 5 Hospital St., Augusta. RHOP: esp. of eastern U.S.A. MACRO: esp. *Catocala.* MICRO: esp. Ægeriidæ. Coll. Ex. Buy. Sell. Rear.
*GREY, L. PAUL, R.F.D., Lincoln. RHOP: Argynninæ only. Coll. Ex. Buy.

MARYLAND

Fales, John H., 1917 Elkhart St., Silver Spring. RHOP. MACRO. Life History, Distribution. Coll. Ex. Buy. Sell.
Ghika, George, 3900 Hamilton St., F 101, Hyattsville. Melanism.

Gillham, Nicholas W., Entomology Section, c/o AS Division, Camp Detrick, Frederick. RHOP: esp. Lycænidæ, *Melitæa, Euphydryas, Hesperiidæ.* Coll. Ex. Buy. Sell.
King, E. Richard, 8323 Haddon Drive, Takoma Park 12. RHOP. Coll. Ex.
MacLeod, Ellis G., Dayton. RHOP: *Colias* of eastern U.S.A.: Taxonomy, Distribution, Biology; Interspecific Hybridization.
*Rawson, George W. (Dr.), No. 1, Nassau Lane, Silver Springs. RHOP. MACRO. Coll. Ex.
*Robinson, Paul F., 332 S. Main St., Bel Air. RHOP. Life History, Physiology. Coll.
Simmons, Robert S., (Dr.), 1305 Light St., Baltimore 30, RHOP. Coll. Ex. Buy. Rear.
Watt, Ward B., 1206 Parker Ave., Hyattsville. RHOP: esp. Nymphalidæ, Lycænidæ, Satyridæ. Polymorphism. Coll. Ex. Buy.

MASSACHUSETTS

*Alexander, Charles P. (Prof.), Fernald Hall, University of Massachusetts, Amherst. Classification, Distribution.
Belcher, Harry C., Jr., 133 Hawthorne St., East Weymouth. LEPID. esp. Papilionidæ. Coll. Ex. Buy.
Cady, Michael E., 21 Border St., Dedham. RHOP. MICRO. Coll. Ex. Buy. Rear.
*Carpenter, A.J., 236 Huntington Ave., Boston. RHOP. MACRO. Coll. Buy.
*Coher, Edward I. (Dr.), 16 So. Elm St., Lynn.
Cottrell, Annette B. (Mrs. G.W.,), 70 Lake View Ave., Cambridge 38. RHOP. Coll.
Edwards, Robert L. (Dr.), 46 Lincoln St., Waltham 54. Ecology.
Hilliard, Stephen S., 25 Beech St., Framingham. RHOP. MACRO. Coll. Ex. Buy. Sell. Rear.
*Johnston, William M., 383 South St., Jamaica Plain 30. RHOP: of New England. Coll.
Kamp, George W., 44 Holmes Rd., Dedham. RHOP. MACRO. Coll. Ex. Buy.
Le Mon, Ivy (Miss), 145 Pinckney St., Boston 14. RHOP. Migration. Coll. Buy.
McCabe, David T., 15 Fiske Rd., Wellesley Hills 82. RHOP: esp. Lycænidæ. Coll. Ex.
Mergott, Winston B., 143 Bay State Rd., Boston 15. RHOP. MACRO. Coll. Ex. Rear.
Potter, C. Nathan, 120 Brook St., East Holliston. RHOP. esp. *Colias, Boloria.* Coll. Ex. Buy. Rear.
Reinthal, Walfried J. (Dr.), Northampton State Hospital, Northampton. RHOP: Nearctic (esp. *Asterocampa*) and Palearctic. Coll. Ex. Buy. Sell. Rear.
Scott, Arthur H., 20 Bishop Pky., Pittsfield. Life History. Coll. Ex. Buy.
Shappirio, David G., Biological Laboratories, Harvard University, Cambridge 38. LEPID. Physiology. Ex. Buy. Rear. Living Material.
*Smith, Marion E. (Dr.), Fernald Hall, University of Massachusetts, Amherst. MACRO. esp. Arctiidæ. Life History. Univ. Coll. Rear.
VAN GERBIG, PETER B., 74 Mt. Auburn St., Cambridge 38. MACRO: esp. Sphingidæ, Ceratocampidæ. Buy. Sell. Rear.
Vogel, L.F., 61 Berkshire Rd., Needham 92. Exotic RHOP. Life History.
Walcott, Charles, 81 Sparks St., Cambridge 38. MACRO: esp. Saturniidæ. Photography, Sex Attractions in Moths. Buy. Sell. Rear.
Williams, Carroll M. (Prof.), Biological Labs., Harvard University, Cambridge 38. RHOP. MACRO: esp. Saturniidæ. Physiology of metamorphosis. Coll. Buy.

MICHIGAN

Crampton, Charlene E. (Miss), Rt. #1, White Pigeon. Coll. Ex. Buy.
*Dreisbach, Robert R., 301 Helen St., Midland. LEPID. of Michigan. Coll.
Goyer, Robert W., P.O. Box 95, Bellaire. RHOP: esp. Papilionidæ, Lycænidæ. MACRO. Coll. Ex. Buy.
Hodges, Ronald W., 1123 Theodore St., Lansing 15. RHOP: esp. Lycænidæ, Hesperiidæ. MACRO. Coll. Rear.
*McALPINE, WILBUR S., 2501 Bokie Lake Road, Route 5, Milford. RHOP: esp. Riodinidæ. MACRO: local. Coll. Ex. Buy. Rear.
Machwart, Robert J., 777 E. 14 Mile Road, Clawson. RHOP. MACRO: esp. Sphingidæ, Noctuidæ. Coll. Ex. Buy. Rear.
*Newman, John H., 9821 Peer Road, R.F.D. #1, South Lyon. LEPID: of Michigan. Coll. Ex. Rear.
*Nielsen, Mogens C., 3415 Overlea Drive, Lansing 17. RHOP. MACRO: esp. Sphingidæ, Saturniidæ, Noctuidæ. Coll. Ex.
Perkins, Owen A., 1605 Crooks Rd., Royal Oak. LEPID: esp. of Michigan. Coll.
*Voss, Edward G. (Dr.), 1015 Lincoln Ave., Ann Arbor. LEPID. of northern Michigan. Hesperiidæ of world, esp. Classification and Phylogeny. Coll. Ex.

Wagner, Warren H., Jr. (Dr.), 721 Mt. Pleasant Ave., Ann Arbor. RHOP: esp. Hesperiidæ, Lycænidæ. MACRO. Coll. Rear.
Ward, (Mrs.) Orville, North Branch. LEPID. Coll. Ex.

MINNESOTA

COX, SAM M., 2624 Minnesota Avenue, Duluth 11. Larvæ of MACRO. and MICRO. Coll. Ex. Rear.
Janzen, Daniel H., Jr., 608 Russell Ave. S., Minneapolis. LEPID. of world. Life History. Coll. Ex. Sell.
Tveten, John L., Kiester. RHOP. Coll. Ex. Buy.

MISSISSIPPI

Jones, Jack R., Jr., 304 Robinhood Road, Jackson. MACRO: Sphingidæ, Saturniidæ, *Catocala.*
*MATHER, BRYANT, P.O. Drawer 2131, Jackson. RHOP. Coll. Ex. Buy. Sell.

MISSOURI

Bright, Robert R., Route 2, Box 77, St. Charles. LEPID. Coll. Ex. Buy.
Heitzman, John R., 3112 Harris Ave., Independence.
JOHNSON, DALE, 724 Grand, Kansas City 6.
Littahorsky, Anton, 3808 Union Rd., St. Louis 23. RHOP. MACRO. Coll. Ex.
*MEINERS, EDWIN P. (Dr.), 6651 Enright Ave., St. Louis 5. RHOP. MACRO. Coll. Buy.
*REMINGTON, P. SHELDON, 5570 Etzel Ave., St. Louis 12. RHOP: esp. *Megathymus, Hesperia,* Lycænidæ, *Œneis, Erebia.* MACRO: esp. Sphingidæ, Saturniidæ, *Catocala.* Coll. Ex. Buy.
Risch, Harold, 9508 Cantwell Drive, Affton 23. RHOP
*Thomas, George W., 106 Whitten Hall, Dept. of Entomology, University of Missouri, Columbia. MACRO: esp. Noctuidæ (Plusiinæ). Coll. Ex.
Twelkemeier, Walter A., 7250 St. Andrews Drive, St. Louis 21. Coll. Ex. Buy. Sell.

MONTANA

Wheaton, William L., St. Ignatius. RHOP: esp. Rocky Mts. Coll.

NEBRASKA

FROEMEL, E.A., Columbus. RHOP. MACRO: esp. *Catocala.* Coll. Ex.
Johnston, David W., Box 377, Broken Bow. RHOP. MACRO. Coll.

NEVADA

Dickinson, Krestine M., Box 435, Reno. LEPID. Coll. Ex. Rear.

NEW HAMPSHIRE

*Gerould, John H. (Prof.), 36 Occom Ridge, Hanover. RHOP: Pieridæ, esp. *Colias,* MACRO: esp. *Bombyx.* Genetics, ecology of *Colias.* Anatomy and circulation of *Bombyx.* Mimicry.
RITTERBUSH, PHILIP C., 30 Mitchell Place, Laconia. RHOP. Coll. Ex. Buy. Rear.
SMITH, RICHARD S., 83 Shore Drive, Laconia. RHOP. Coll. Ex. Buy. Sell.

NEW JERSEY

Bowe, John J. (Dr.), 1017 Woodland Ave., Oradelle. RHOP. MACRO. Coll. Ex. Rear.
*BUCHHOLZ, OTTO, 493 Markthaler Place, Roselle Park. RHOP. MACRO. Coll. Ex. Buy. Rear.
Cadbury, John W., III, Spung Hollow, R.D. #1, Pemberton. MACRO: esp. Noctuidæ, Notodontidæ, Sphingidæ. Coll. Ex. Buy. Sell.
Comstock, W.P., R.F.D. 2, Box E, Shark River Hills, Neptune.
*DOS PASSOS, CYRIL F., Washington Corners, Mendham. RHOP: esp. Satyridæ. Coll. Buy.
Fleming, Henry, Box 84, Coytesville.
MULLER, JOSEPH, R.D. 1, Lebanon. LEPID. of New Jersey only. Life History. Coll.
Osborne, Melville W., 2100 Price Street, Rahway. RHOP. MACRO. Coll. Sell. Rear.
Small, Gordon B., Jr., 100 Oxford St., Glen Ridge. RHOP: esp. Lycænidæ. MACRO. Coll. Ex.

Treat, Asher E. (Dr.), 51 Colonial Parkway, Dumont. MACRO. Tympanic organs. MICRO.

ZIEGLER, J. BENJAMIN (Dr.), 64 Canoe Brook Parkway, Summit. RHOP: Lycænidæ (esp. Theclinæ). Coll. Ex. Buy.

NEW MEXICO

Eyer, John R. (Dr.), Box 66, State College. MICRO: esp. Lyonetiidæ, Opostegidæ, Nepticulidæ. ♂ and ♀ Genitalia.

Nymeyer, Robert, 116 S. Canal St., Carlsbad. RHOP. Coll.

NEW YORK

*Bell, Ernest L., 150-17 Roosevelt Ave., Flushing 54. RHOP: esp. Hesperiidæ.

BUXBAUM, Paul, 360 Central Park West, New York 25. RHOP: esp. Papilionidæ. Coll.

DOYLE, L.F. BOKER, Duck Pond Rd., Glen Cove, Long Island.

Duane, John P., 33 Grandview Circle, Manhasset.

Farquhar, Donald W. (Dr.), 185 Claremont Ave., New York 27. LEPID. Food Plants, Distribution, Life History, etc. Coll. Ex.

Flint, Oliver S., Jr., Dept. of Entomology, Cornell University. LEPID. Coll. Ex. Rear.

*FRANCLEMONT, JOHN G. (Dr.), Dept. of Entomology, Cornell University, Ithaca. MACRO: esp. Noctuidæ, Notodontidæ, Lymantriidæ. Coll. Ex. Buy. Rear.

*FREDERICK, ALBERT C., 6 Matilda St., Albany 9. RHOP: esp. Lycænidæ. Coll. Ex.

Gertsch, Willis J. (Dr.), American Museum of Natural History, New York 24. Nearctic RHOP., esp. Lycænidæ. Coll. Ex.

Goliger, Melvin J., 369 Alabama Avenue, Brooklyn 7. RHOP. MACRO. Coll. Ex. Buy. Sell. Rear.

*HEINEMAN, BERNARD, 175 West 72nd St., New York 23. RHOP: of Jamaica. MACRO: esp. *Catocala.* Coll.

Hellman, Geoffrey T., 228 E. 61st St., New York 21.

Hopf, Alice Lightner (Mrs.), 136 West 16th St., New York 11. Migration. Coll.

*Keji, Joseph A., Biggs Hospital, Ithaca. RHOP. MACRO. Traps, Photography. Ex. (pupæ). Rear.

*Klots, Alexander B. (Prof.), American Museum of Natural History, New York 24. RHOP: esp. *Boloria, Colias.* MICRO: esp. Crambinæ. Coll. Ex. Buy. Rear.

Knowlton, Carroll B., Jr., 100 W. Buffalo St., Ithaca. RHOP. MACRO. Coll. Ex. Buy. Sell. Rear.

Latham, Roy, Orient, Long Island. LEPID. Coll. Rear.

Miller, Howard C. (Dr.), 242 Westminster Ave., Syracuse 10. RHOP: esp. tropical Pieridæ, Nymphalidæ. MACRO. Coll. Buy. Rear.

Morris, John W., 2704 W. Genesee St., Syracuse 4. RHOP: esp. Papilionidæ. MACRO: esp. Sphingidæ. Coll. Ex. Buy. Rear.

*Nabokov, Vladimir (Prof.), Goldwin-Smith Hall, Cornell University, Ithaca. RHOP: esp. Holarctic Lycænidæ.

Obraztsov, Nicholas S. (Dr.), 68 Glenlawn Ave., Sea Cliff, Long Island. LEPID: esp. Palearctic Ctenuchidæ, Holarctic Tortricoidea. Morphology of Genitalia.

Richter, Max L., Butterfly Farm, East Durham. RHOP. MACRO. Coll. Ex. Buy. Sell. Rear.

Riley, Thomas J., Box 6, Brandywine Station, Schenectady 4. RHOP. MACRO. Coll. Buy.

*Rindge, Frederick H. (Dr.), American Museum of Natural History, New York 24. MACRO: esp. Geometridæ. Life History. Coll. Ex. Buy. Sell.

Roberts, M. Anthony, 3 Blackstone Place, Riverdale 71. RHOP. MACRO. Life History. Coll. Buy. Rear.

*Rupert, Laurence R., Sardinia MACRO: Geometridæ esp. Ennominæ. Life History. Coll. Ex. Rear.

Sanford, Leonard J., 378 West End Ave., New York 24. RHOP. of East Indies and New Guinea, esp. Pieridæ. Ex.

*Shoumatoff, Nicholas, Box 333, Bedford. LEPID: of eastern U.S.A. and West Indies. Distribution, Morphology. Coll. Ex.

Shulgin, Michael, 3324 Perry Ave., Bronx. RHOP. MACRO, esp. Geometridæ. Coll. Ex.

*Spelman, M., 2277 Andrews Avenue, Bronx 68. RHOP. esp. Pieridæ. MACRO. Coll. Ex. Buy. Sell.

Thaxter, E. Lincoln, 681 Lexington Ave., New York City.

Thunelius, Robert E., 90-13 168th St., Jamaica 32. RHOP. esp. *Papilio,* Nymphalidæ. Coll. Ex. Buy. Rear.

White, Galen (Rev.), Fisherman's Methodist Church, 226 Bay 35th St., Brooklyn 14.
*Whittaker, Robert H. (Dr.), Biology Dept., Brooklyn College, Brooklyn 10. Ecology.
Wilcox, LeRoy, Speonk, Long Island. LEPID. Coll. Ex.

NORTH CAROLINA

Butler, Robert, Box 1057, Southern Pines. RHOP: of world; esp. Papilionidæ, Nymphalidæ, Pieridæ. MACRO: Saturniidæ. Coll. Ex. Buy.
Eaton, Theodore H., Jr., East Carolina College, Greenville. RHOP. MACRO. Coll. Ex. Buy. Sell.
*Gottschalk, Carl W. (Dr.), 1300 Mason Farm Road, Chapel Hill. RHOP: esp. of Arctic. Pigment Metabolism. Coll. Ex. Buy. Sell.
Jamison, J. R., Jr., 12 Thomson Ave., Canton. RHOP. esp. Papilionidæ, Heliconiidæ. Coll. Ex. Buy. Sell.
*McELVARE, ROWLAND R., Southern Pines. MACRO: esp. Heliothiinæ. Coll. Ex. Buy. Rear.

NORTH DAKOTA

Adler, Julius, 407 Oak Street, Grand Forks. RHOP. Coll. Ex.

OHIO

*Baker, Clement W., P.O. Box 455, Waynesburg. RHOP. MACRO. Coll. Buy.
*Braun, Annette (Dr.), 5956 Salem Road, Mt. Washington, Cincinnati 30. MICRO: esp. *Bucculatrix.* Coll. Ex. Rear.
*Ferguson, Elias A., 1213 Bellflower Ave. S.W., Canton 10. RHOP: esp. *Papilio.* MACRO: esp. *Catocala.* MICRO. Coll. Ex. Buy. Sell.
*Lauck, Albert G., 5142 Harvest Lane, Toledo 13. RHOP. Coll.
Miller, Dale D., 5795 Mill Creek Blvd., Boardman. RHOP. esp. Nymphalidæ. Coll. Ex.
*Smalley, Stephen B., 6129 Glade Ave., Cincinnati 30. RHOP. MACRO. Life History Photography. Coll. Ex. Buy. Rear.
Taylor, Herbert S., 1369 Fair Ave., Columbus 5. RHOP. MACRO. Coll. Buy.
Thomas, Edward S., Ohio State Museum, Columbus 10. RHOP: esp. Hesperioidea, Hair-streaks. MACRO: esp. *Catocala.* Life History, Distribution. Coll.
Wren, George R., 437 30th St., N.W., Canton 9. RHOP: esp. Satyridæ. Coll.

OKLAHOMA

†*WILSON, KENT H., 2217 "C" Court, Lahoma Courts, Enid. RHOP: esp. Papilionidæ. MACRO: esp. *Catocala.* MICRO: esp. Jugatæ. Life History. Coll. Ex. Buy.

OREGON

*Albright, Ray, Route 1, Box 277, Dayton. RHOP. Coll. Ex.
*Baker, James H., 2800 Broadway, Baker. LEPID. Coll. Ex.
*CRICKMER, NOËL (Mr.), Box 6, Joseph. LEPID: esp. Geometridæ. Coll.
Jewett, Stanley G., Jr., 7742 S.E. 27th Ave., Portland 2. RHOP. esp. *Euphydryas.* Coll. Ex.
Macy, Ralph W. (Prof.), Dept. of Biol., Portland State College, 1620 S.W. Park Ave., Portland 1. RHOP. MACRO. Coll. Ex. Buy. Rear.
Scott, Leonard M., 6537 S.E. 83rd St., Portland 66. RHOP. esp. Papilionidæ, Heliconiidæ. MACRO. esp. Noctuidæ. Coll. Ex. Buy. Sell. Rear.

PENNSYLVANIA

*ACKERMANN, OTTO, 639 Walnut St., Irwin. RHOP. MACRO. Coll. Sell. (Plastic mounts).
*Adams, Joseph W., 32 Pleasant 19. RHOP. Coll. Ex.
Anderson, Richard A., 411 Summit Drive, Pittsburg 34. RHOP. MACRO. Coll. Ex.
*CARY, MARGARET M. (Mrs.), Ellet Lane and Wissahickon Ave., Mt. Airy, Philadelphia 19. MACRO: esp. Sphingidæ. Coll. Ex. Buy. Rear.
*Clench, Harry K., Section of Insects and Spiders, Carnegie Museum, Pittsburg 13. RHOP: Lycænidæ, esp. Theclinæ. MACRO. Coll. Ex. Buy.
Dixon, Bruce W., II, 119 Cherry Valley Road, Pittsburg 21. RHOP: esp. Hesperioidæ. MACRO. Coll. Ex. Buy. Rear.
Ehle, George, 314 Atkins Ave., Lancaster. RHOP. Coll. Rear.
Graybill, Richard, 1255 Rosemont Lane, Abington.

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†Life Member

*Jay, William, 6358 McCallumn St., Germantown, Philadelphia. RHOP. esp. *Papilio.* Buy.
Kopp, Larry J., R.D., Klingerstown. LEPID. Coll. Sell. Rear.
Malcolm, John A., Jr., 1590 Williamsburg Road, Pittsburg 16. RHOP: esp. Pierinæ. MACRO. Coll. Ex. Sell. Rear.
†MELLON, E.P. II, 441 Maple Ave., Pittsburg 18. LEPID. Coll. Ex. Buy. Sell.
*MERKER, C.G., 1520 Cooper St., N.S., Pittsburg 12. LEPID. Coll. Ex. Buy. Sell.
*Moyer, Howard C., Box 240, R.D. 2, Sinking Spring. RHOP. MACRO. Coll. Ex. Buy. Sell.
Murchie, William R., Thiel College, Greenville. RHOP. Coll. Ex.
*Napier, Arthur H., 503 East Willow Grove Ave., Chestnut Hill, Philadelphia 18. Nearctic RHOP. MACRO: esp. Sphingidæ, *Catocala.* Coll. Ex.
*Peters, George, Adamstown. RHOP. MACRO. Coll. Ex. Buy. Sell.
Prescott, John, 1932 B. Drive, Buffalo Rd., Erie. LEPID. Coll. Ex. Buy. Rear.
Rupprecht, Jerome (Rev.), St. Vincent Archabby, Latrobe. RHOP. MACRO. Coll. Ex.
Seibert, Ray P., 1302 Fairview St., Reading. LEPID. Coll. Ex. Buy. Sell.
STAFFORD, CHARLES W., 1125 Tennessee Ave., Pittsburg 16. RHOP. MACRO. Coll. Ex. Sell. Rear.
*Tietz, Harrison M. (Prof), Dept. of Zoology, Pennsylvania State University, State College. RHOP. MACRO: esp. Noctuidæ. Life History. Coll. Ex. Buy.
Wenzke, John, 25 South Summit St., Lock Haven. RHOP. Distribution. Coll. Ex.

RHODE ISLAND

Dane, Benjamin, Indian Ave., Middletown. MACRO: Saturniidæ, esp. Life History Photographs and Sexual Attractions. Coll. Ex. Buy.
French, Ellery W., 247 Washington Ave., Providence 5. RHOP. MACRO.
Sheldrick, Peter, Box 1710, Brown University, Providence 12. RHOP. esp. Lycænidæ, Nymphalidæ. MACRO. esp. Saturniidæ. Coll. Rear.

SOUTH CAROLINA

Edwards, Roberts L. (Dr.), Ardea, McClellanville. Ecology.
Twelkemeier, C.H., 1192 Thurmond St., North Augusta. RHOP. Coll. Ex. Buy. Sell.

SOUTH DAKOTA

Oberfoell, Jim, Box 85, Deadwood. RHOP. MACRO: esp. *Catocala.* Coll. Ex.

TENNESSEE

Roever, Kilian, R.F.D. #2, Jackson. RHOP. esp. Hesperioidea, Theclinæ. Coll. Ex. Buy. Sell.
Webster, Clarence G., 1500 Ridley Blvd., Nashville 4. LEPID. Coll. Buy.
Wilcox, William J., 213 Alhambra Rd., Oak Ridge. RHOP.

TEXAS

ANDERSON, C.A., 3209 Centenary, Dallas 25. RHOP: esp. *Danaus plexippus.* Migration. Rear.
Cope, Vernon M., 6605 Meadowlawn Drive, Houston 23. LEPID: esp. *Papilio, Colias, Pieris.* Flight, Congregations. Coll. Ex. Sell.
*Freeman, Hugh A., 1335 Overhill Drive, Garland. RHOP: esp. Hesperioidea, Theclinæ. Taxonomy, Ecology. Coll. Ex. Buy. Sell. Rear.
*Glick, Perry A., P.O. Box 1033, Brownsville. RHOP: esp. Papilionidæ. MACRO: esp. *Catocala,* Saturniidæ. Aerial Insect Dissemination and Migration, Cotton Insects. Coll. Ex. Buy.
Gunn, George, Box 197, Channelview. All large LEPID. Coll. Ex. Buy.
Kendall, Roy O., 135 Vaughn Pl., San Antonio 1. LEPID. Life History. Coll. Ex. Sell.
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*STRUCK, B., P.O. Drawer 271, Brownsville, RHOP.

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p.16, first line of KIMBALL note: "till 1952 was" should be "till 1942 was".

p.18, line 25: "members from" should be "members and guests from".

p.45, line 11: "they come from my" should be "they form my".

p.50, in 13th and 14th lines from bottom: "SCHELLBACK" should be "SCHELLBACH".

p.51, middle: "Chermock" should be "Chermock & Chermock".

p.66, in *References*: "Bernardi, G., 1951" should be "Bernardi, G., 1941".

p.87, line 16: *"esmeocrærula"* should be *"Desmeocrærula"*.

p.87, line 23: *"griseoargestea"* should be *"griseoargentea"*.

p.94, line 24: "Banergee" should be "Banerjee".

p.94, line 41: "XI. Lépidoptères" should be "XVIII. Lépidoptères".

Nos.4-5, back cover: has 7 incorrect page numbers and omits PHILLIPS note (p.143).

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Volume 10 1956 Numbers 1-2

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COLIAS HYBRIDIZATION
A NEW *MEGATHYMUS* FROM NEW MEXICO
PIERIS VIRGINIENSIS IN NEW AREAS
THE HAND-PAIRING TECHNIQUE
BIBLIOGRAPHY OF CATALOGUES

(Complete contents on back cover)

10 August 1956

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NOTES ON *MEGATHYMUS URSUS*, WITH DESCRIPTION OF A RELATED NEW SPECIES (MEGATHYMIDÆ)

by DON B. STALLINGS and J. R. TURNER

Megathymus ursus has intrigued us ever since we became interested in the genus *Megathymus*. There were probably two reasons: 1) its huge size and 2) its extreme rarity in collections. This species was described by POLING in 1902 from a single female specimen (*Ent. News*, vol 13: p. 97, pl. 4). The original description reports the type caught in Pinal County, Arizona. No date for capture is given. It is interesting to note that while POLING described this as a new species he did not actually think that it was. He considered it the female of *M. neumoegeni*.

Sometime in the early 1940s we started making inquiries about this species. We learned that at that time there were only three specimens known, all females and all in the Barnes Collection in the United States National Museum. The two specimens other than the type had the following data: Redington, Ariz., no date, and Santa Catalina Mts., Ariz., Pinal County, Aug. 16 — 23.

Our first impression of *M. ursus* after viewing the colored plates of Poling and Holland was that it was an overgrown *M. yuccæ* Bdv. & Lec. In as much as the *Yucca* feeders of this genus usually fly in the spring or early summer (whereas the *Agave* feeders usually fly in the late summer or fall), we decided that the normal period of flight should be in the late spring or early summer. Following this idea DON B. and VIOLA STALLINGS and sons, DEE and JACK, went into southeast Arizona in June of 1946 to hunt for *M. ursus;* that they did not find any was no great surprise.

The next few years we did no active hunting for this species but did correspond with a great many collectors trying to get ideas as to when and where to look for it. We discussed the situation for hours with our friend, H. A. FREEMAN, who was just as interested in the subject as we were, and we have often wondered if our friend LLOYD M. MARTIN, of the Los Angeles County Museum, ever got tired of answering the many letters we wrote him on the subject.

We discarded the idea of it being a *Yucca* feeder and turned to the *Agave* plants. One species, *A. palmeri* Engelmann, because of its huge size, was a prime

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favorite as a possible food plant. This was not a new idea on our part, for most of the collectors who had hunted for *M. ursus* felt that *A. palmeri* was the plant.

Our interest was renewed in 1949 when MARTIN advised us that R. H. REID had captured a female in Madera Canyon in the Santa Rita Mts. of Arizona on Aug. 15th. In the fall of 1951 Dr. and Mrs. R. C. TURNER decided to do some looking for this species. They returned home without any specimens, but with the report that while in the Museum of the Chiricahua National Monument in the Chiricahua Mts. of Arizona they saw a female specimen that had been caught in the Monument. The specimen had no date on it. They also brought back with them a huge bloom stalk of *A. palmeri* with a hole in it that had all the indications of being the work of a larva of *Megathymus*. We were sure that this was the answer to our problem and that it was merely a matter of going back and collecting the larvæ. We assumed that the larvæ left the egg and went into the bloom stalk as it was growing. The following spring found Dr. and Mrs. TURNER in Arizona again, but of course the bloom stalks had not commenced to grow. They returned home empty handed.

On Aug. 24th, 1952, ROBERT J. FORD caught a female specimen in Madera Canyon. DON B. and VIOLA STALLINGS immediately left for Arizona. After considerable hunting they were able to find a bloom stalk with an occupant. It turned out to be a wild bee. Then they made a plant survey of all the possible areas where M. *ursus* had been found or might be expected. There was one potential food plant that was conspicious: *Yucca schottii* Engelmann. During 1953 as we considered the problem further and discussed it with FREEMAN, we became convinced that *M. ursus* was a *Yucca* feeder and that *Y. schottii* was the food plant. That fall MARTIN advised us that another female had been caught in Madera Canyon on Aug. 10th. There were now 7 known specimens, all females, and four with dates of capture.

In August of 1954 Dr. & Mrs. R. C. TURNER and DON B., VIOLA, DEE, and JACK STALLINGS returned to Arizona in further search of *M. ursus*. Three days before they arrived in the Chiricahua Mts. there had been heavy rains which had done considerable eroding. On the morning of Aug. 18th at 10.30 A.M., while we were driving down Pinery Canyon in the Chiricahua Mts. at an elevation of 6200 feet, a female *M. ursus* was spotted flying around several juvenile plants of *Yucca schottii* presumably trying to decide on which plant to deposit an egg. The plants were on the side of the mountain with a ten foot bank above the road. JACK STALLINGS was the first who was able to scale the bank with net in hand and he carefully swept the female into his net. As he flipped the net to complete the capture it caught on a thorn bush and an 18 inch hole was ripped in the net. The *M. ursus* was gone in a flash. Like ALEXANDER he sat down and cried; — his father wanted to. No other specimens were observed on this trip. Careful search of the *Y. schottii* plants failed to turn up any larvæ or pupæ. Seven old "tents" were found in young plants, and in one the pupal case was still in good condition. There could be no doubt now as to the food plant of *M. ursus*.

In March of 1955 Dr. and Mrs. TURNER returned to the Chiricahua Mts. in a further search for larvæ. In three days hard searching they found 8 larvæ. On three of the plants with larvæ the egg shell was still attached to the leaf. The eggs do not appear greatly different from the eggs of other *Megathymus* that feed on *Yucca.* The largest egg measured 4.25 mm., the average diameter was 4.0 mm. The female nearly always selects a tiny plant on which to lay an egg. It may be a new plant or a new shoot off of an old plant; it usually does not have over 15 leaves. The plant is small enough so that normally the larva kills the plant or shoot, the leaves then flatten out on the ground, and tree leaves blow over the plant making it next to impossible to find the "tent". All larva-bearing *Yucca* were found in timber, usually on the side of a canyon or mountain. The larvæ, still in their food plant, were brought back to Caldwell. On June 25th three of the larvæ were checked. All three had hymenopterous parasites (Eucoilidæ). On July 7th the other five larvæ were checked. Four of them had parasites; the last had an empty pupal case, still damp. Thereupon there was a frantic search of the basement area where these five larvæ had been kept. Finally Mrs. STALLINGS found the remains: it was male; the abdomen was gone, one antenna remained, three wings were half gone, the fourth was in good condition. The conversation that ensued will not be repeated here.

On July 17th the clan was gathered and fifteen of us left for the Chiricahua Mts. Seven of us were in the field for four days, despite the constant rain. The first day we found three "tents", all with larvæ in about the third instar. This upset our thinking on what we should be finding until we realized that these were not *M. ursus* larvæ, but were larvæ of a species of the *M. yuccæ* complex which normally feeds on *Yucca confinis* McKelvey (our identification) but will on occasion lay eggs on *Y. schottii.* The second day one pupa was found, and on the third day two pupæ were found. The fourth and last day yielded nothing. The first pupa hatched July 30th and was a male; the other two hatched August 6th and were females. So far as we know these two males are the only males known. We will not go into any lengthy description, as the plates picture the male and female. It will be noted that the antenna of both sexes is white. The yellow wing-spots in both sexes have a bit more buff or orange color than we had expected from the previous specimens we had examined. We designate the July 30th male specimen, pictured herein, as the ALLOTYPE of *M. ursus.*

We have more than 2000 specimens of *Megathymus,* three-fourths of which were reared from collected larvæ or pupæ. We have always been able to get a newly hatched specimen to crawl up on our finger and remain there for several minutes motionless, except with *M. ursus.* Once touched they seem to go crazy and begin to beat themselves to pieces. The party collecting the three pupæ included Dr. and Mrs. R. C. TURNER, Dr. and Mrs. J. R. TURNER, JUDITH, GAYLE and J. R. JR., Mr. and Mrs. DON B. STALLINGS, DEE and JACK, R. L. TURNER JR., MARY LEE TURNER, Mr. and Mrs. W. O. RAYPHOLTZ.

In August of 1953 Dr. and Mrs. R. C. TURNER, Dr. and Mrs. J. R. TURNER, JUDITH and GAYLE discovered some old tents in *Yucca torreyi* Shafer while doing some research in Carlsbad Caverns National Park in New Mexico. In March of 1954 Dr. and Mrs. R. C. TURNER returned to the area and collected 7 larvæ. The larvæ did not look unlike larvæ of members of the *M. yuccæ* complex, but they continued to feed up to the first of May, whereas the larvæ of the *M. yuccæ* complex do little or no feeding after overwintering. Three of these larvæ pupated and hatched. In March of 1955 Dr. and Mrs. R. C. TURNER collected 4 larvæ in the area as they were returning from the Chiricahua Mts. with the 8 *M. ursus* larvæ. The *M. ursus* larvæ were a full instar behind the Carlsbad larvæ. In May 1955 more larvæ were collected by Dr. J. R. TURNER, Mrs. R. C. TURNER, JACK and Mr. and Mrs. DON B. STALLINGS, and KENT WILSON, including 9 larvæ in *Yucca baccata* Torrey. When the first specimen emerged in 1954 it was evident that we had something new and in our opinion the most beautiful of all the *Megathymus* now known. It is described as follows:

Megathymus violæ STALLINGS & TURNER, new species

FEMALE. Upper surface of primaries: deep black with a small amount of white hairs at the base of the wing and a larger amount of white scales on the tip that gives the base and tip a gray appearance. Spot 1 (cell spot) is bright orange. Spots 2, 3, and 4 (subapical spots) are elongated, the bottom two being bright orange in color and the top one white, with a white spot located inward from it. Spot 5 and 6 (submarginal spots) are bright orange and rather long. The discal band, composed of spots 7, 8, and 9, is bright orange. These spots are also elongated, being 8 mm. to 10 mm. long. The fringes are smoky with vein-tips black. Spots 5, 6, 7, 8, and 9 are in alignment on the outer edge.

Under surface of primaries: black with the tip and outer margin overscaled with white, giving that area a gray appearance. All dorsal spots reappear. Spots 1, 5, 6, 7, 8, and 9 are light orange. Spots 2, 3, and 4 are white. Spot 9 (bottom spot) extends inwardly (narrowly) almost to the base.

Upper surface of secondaries: deep black with a small amount of white hairs at the base that creates a gray appearance in this area. There is a small, faint orange spot between veins Cu_1 and M_3. The fringes are white with vein tips black.

Under surface of secondaries: black overscaled with white, giving a gray appearance. The veins do not carry the white overscaling, thus giving a very contrasting appearance. The costal area is heavily overscaled with white and has two white spots in it. There is a small white spot between veins A_1 and Cu_2 in the anal area.

Abdomen: black. Thorax: gray above, blackish below. Palpi: light gray. Antennæ: white. Head: black around the eyes and gray around the antennæ.

Length of forewing from 35 mm. to 40 mm.; average 37 mm. Wing measurements of the Holotype: forewing, apex to base 39 mm., apex to outer angle 25 mm., outer angle to base 24 mm.; hindwing, base to end of vein Cu_1 28 mm.

MALE. Upper surface of primaries: deep black with the same general overscaling as in the female, except in a smaller degree. The spots are the same as in the female, only smaller; however, spots 2 and 3 are white instead of bright orange. The fringes are checkered gray and black.

Upper surface of secondaries: deep black with a few white hairs at the base. The fringes are white with vein-tips black.

Under surface of primaries: as in the female, except that spot 9 does not extend inwardly as much as in the female.

Under surface of secondaries: as in the female, except that the white overscaling is more dense.

Abdomen, thorax, palpi, antennæ, and head as in the female.

Length of forewing from 26 mm. to 31 mm., average 30 mm. Wing measurements of Allotype: forewing, apex to base 31 mm., apex to outer angle 20 mm., outer angle to base 20 mm.; hindwing, base to end of vein Cu_1 21 mm.

The genitalia of both sexes are small compared to other species of *Megathymus*. The male genitalia of *M. violæ* do not appear to be as dense as *M. ursus*. The apical portion of the valva of the male *M. violae* is less than 0.4 times as wide as the widest point in middle of the valva, while the apical portion of the valva of the male *M. ursus* is about 0.6 times as wide as the widest point in middle of valva. In *M. ursus* the uncus seen in lateral view tapers evenly, whereas in *M. violæ* it has a pre-apical enlargement before abruptly tapering to a point. In the female of *M. ursus* the genital plate has a strong lateral spur on each side, while in *M. violæ* this spur is much weaker. (See figures.)

Described from 21 specimens (7 males and 14 females), all ex-larvæ. Specimens collected in the Carlsbad Caverns National Park in the Guadeloupe Mts., New Mexico. Food plant: *Yucca torreyi* Shafer. Not included in the type series are two females and three males, ex-larvæ, that used *Yucca baccata* as a food plant. We have not been able to find characters to distinguish the *Y. baccata* feeders from the *Y. torreyi* feeders.

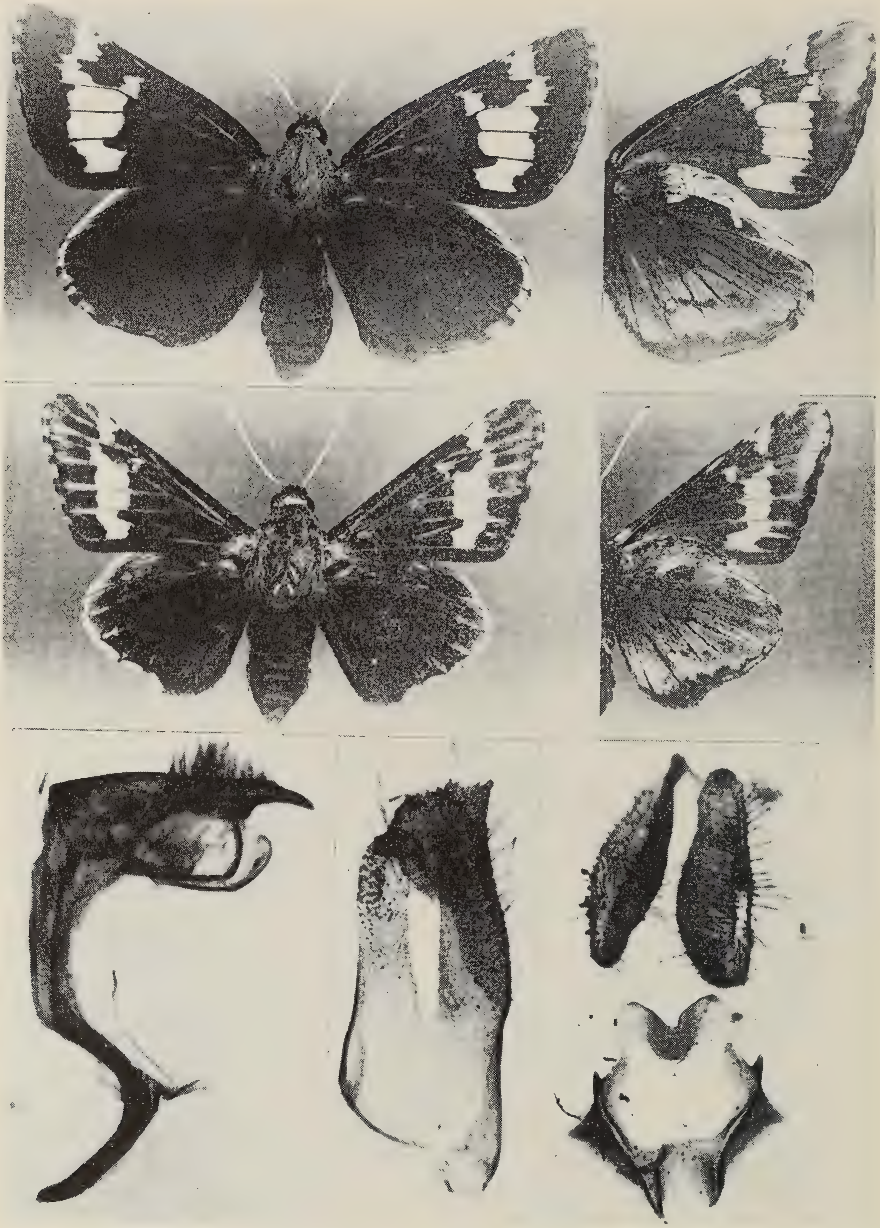
HOLOTYPE, female, June 29, 1955 (STALLINGS & TURNER); ALLOTYPE, male, June 26, 1955 (STALLINGS & TURNER), both from Carlsbad Caverns National Park, New Mexico, are in the collection of the authors. One male and one female paratype is being deposited in each of the following collections: U. S. National Museum, American Museum of Natural History, Los Angeles County Museum, H. A. FREEMAN, KENT WILSON, Dr. C. L. REMINGTON.

We have seen fit to make the female the HOLOTYPE, particularly in view of the fact that *M. ursus* was described from a single female. We are seriously considering using females for Holotypes in future papers on this genus, because the female seems to present the distinguishing characters better. Nearly every entomologist with whom we have discussed this question agrees that it would probably be best to use the female.

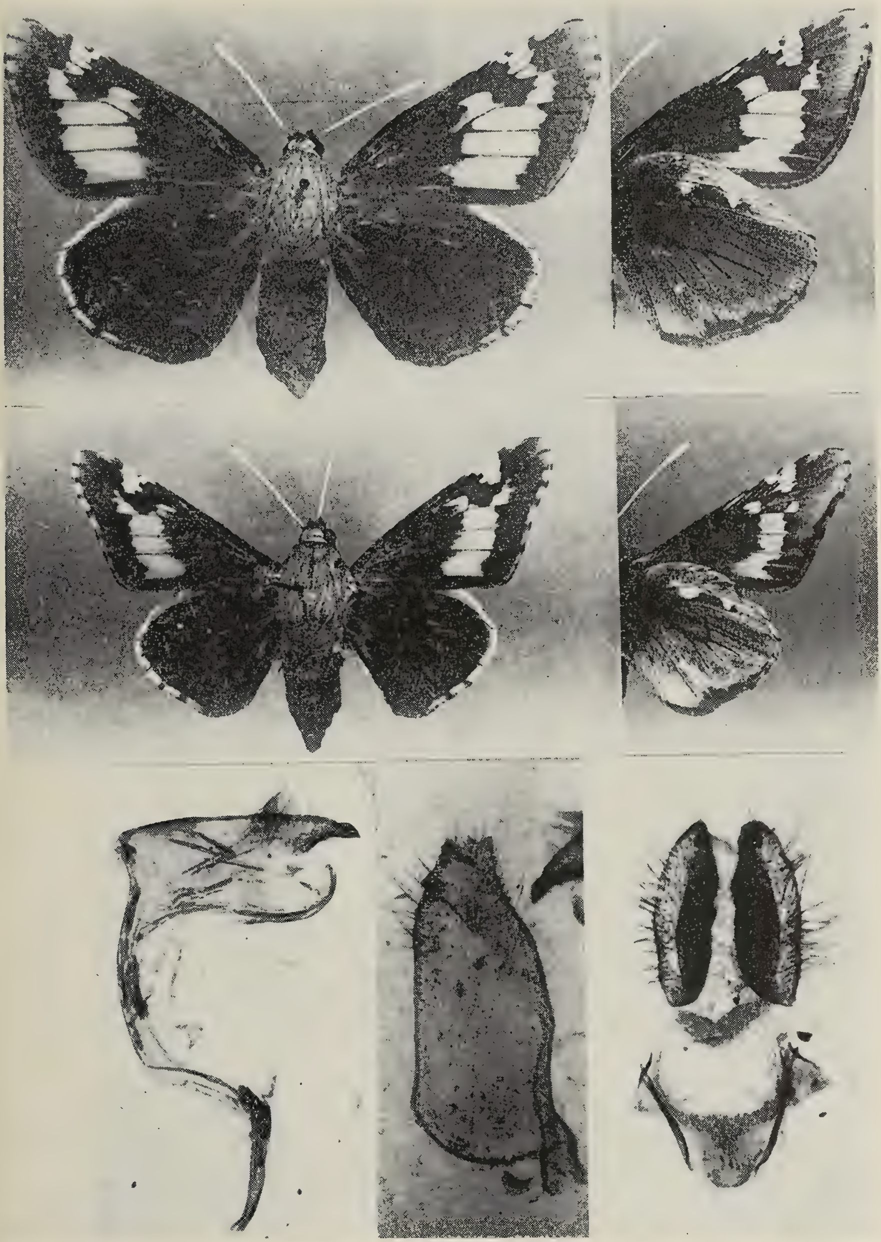
M. violæ has two major characters by which it may easily be distinguished from *M. ursus:* 1) the wing spots are bright orange, almost red, in color; in *M. ursus* these are brassy yellow; 2) these spots are larger, particularly spot 9, which is as large as or larger than spots 8 and 7; in *M. ursus* spot 9 is somewhat smaller than 8 or 7. The food plants and habits are also quite different. *M. ursus* appears to prefer timbered areas, and the females at least, in searching for plants on which to deposit eggs, must fly under and through the timber and usually select plants on the side of mountains or canyons. *M. violæ* nearly always selects plants on level terrain for oviposition. We found all of the larvæ either on top of the mesa-like mountains or at the bottom of canyons. We doubt that the female normally flies above the brush line, for all larvæ were found in open areas. A number of small areas were open and had ideal plants but were completely surrounded by brush; never did we find a "tent" in such an area. And while *M. violæ* selects a small plant on which to lay her egg, it selects larger plants than does *M. ursus,* for the larva seldom kills the plant and in several instances we found two "tents" in a single plant, each larva with its burrow separate from that of its companion.

We doubt that *Y. baccata* is a regular food plant of *M. violæ,* for of the 9 larvæ collected all hatched, but 4 were unable to expand the wings. On the other hand, of the *Y. torreyi* feeders only two that hatched failed to expand.

M. violæ plays host to parasites both of the Tachinidæ (Larvævoridæ) and the Eucoilidæ, but thus far we have found *M. ursus* parasitized only by Eucoilidæ.



Top row: *M. ursus* ♀, Chiricahua Mts., Ariz., 6 Aug. 1955 (Specimen No. 136, S. & T. Coll.).
2nd row: *M. ursus* ♂, Chiricahua Mts., Ariz., 30 July 1955 (No. 130, S. & T. Coll.).
[Uppersides at left; undersides at right]
Lower row: *M. ursus* genitalia, left to right: ♂ uncus and ♂ valva (No. 130, S. & T. Coll.); ♀ genital plate, Madera Canyon, Ariz., 15 Aug. 1949, R. H. Reid Coll. (No. 118).



Top row: *M. violæ* HOLOTYPE ♀, Carlsbad Nat. Park, N. Mex., 29 June 1955 (S. & T. Coll.).

2nd row: *M. violæ* ALLOTYPE ♂, Carlsbad Nat. Park, N. Mex., 26 June 1955 (S. & T. Coll.).

[Uppersides at left; undersides at right]

Lower row: *M. violæ* genitalia, left to right: ♂ uncus and ♂ valva, Carlsbad Nat. Park, N. Mex., 31 May 1954 (No. 115, S. & T. Coll.); ♀ genital plate, Carlsbad Nat. Park, N. Mex., 27 May 1954 (No. 116, S. & T. Coll.).

Contrary to previous reports, *M. ursus* does have spines on the claw segment of the hind tibiæ; however, they are few and small. *M. violæ* has a good number of well developed spines in this area, twice as long as those of *M. ursus.*

The *M. ursus-violæ* complex can be distinguished from other species groups of the genus by the white antennæ and the gray overscaling on the undersides of the secondaries, in which the veins do not carry the overscaling, thus creating a very contrasting appearance.

M. violæ is named for the wife and sister of the authors, who has played a major part in the work on the genus *Megathymus.*

These two species seem to be combination sap feeders and pulp feeders; the burrow they make in the plant as larvæ is usually not over six inches deep and they do not powder the burrow with the usual white powder of *Megathymus* until a few days before they pupate, whereas the members of the *M. yuccæ* complex will often powder the upper portion of their burrow many weeks before they pupate. The burrow of other known *Yucca* feeding *Megathymus* is much deeper, and these appear to feed on pulp. The *Agave* feeders make little or no burrow beyond a space fitting the larval body, and these are presumed to feed on sap.

Our limited experience with *M violæ* and *M. ursus* indicates that their period of flight varies from year to year. The determining factor is probably the type of winter. If the winter is open and mild they probably fly early, and if the winter is severe or late they fly late. Our Carlsbad material in 1954 hatched from May 27th to June 4th, but in 1955 (which had a late freeze) the hatching period was from June 20th to July 8th. Normally we may expect *M. ursus* to fly during the month of August and *M. violæ* to fly during the month of June.

Some statistical information may be of interest. The average actual field time consumed per *M. ursus* collected was 77½ man hours (this was for the field work in 1955, when we knew what to look for and where to look), and for *M. violæ* it was 7¼ man hours per specimen.

It is our guess that *M. violæ* is now at the peak of a population increase, while *M. ursus* is at the bottom of a decline. This might explain in part why *M. violæ* is now, in some instances, using *Y. baccata* as a food plant. It will be interesting to discover whether *M. ursus* ever uses any of the *Y. baccata* complex (*Yucca confinis* McKelvey, *Yucca thornberi* McKelvey, *Yucca arizonica* McKelvey) as a food plant.

We wish to thank the National Park Service for their cooperation in our research on these butterflies and particularly the personnel of Carlsbad Caverns National Park and Chiricahua National Monument. Our thanks also go to WILLIAM D. FIELD of the U.S.N.M. for photographs of the Barnes specimens; LLOYD M. MARTIN, R. H. REID and ROBERT J. FORD for the loan of specimens for dissection; H. A. FREEMAN and Drs. C. L. REMINGTON and C. D. MICHENER for their advice and help in the preparation of this paper.

Caldwell, Kansas, U. S. A.

HYBRIDS BETWEEN *COLIAS EURYTHEME* AND *C. INTERIOR* (PIERIDÆ)

by SHIGERU ALBERT AE

Hybrids in the genus *Colias* present problems in the fields of genetics, ecology, and evolution. Studies of the hybrids between *C. eurytheme* and *C. philodice* have been published by GEROULD (1923, 1943, 1946), HOVANITZ (1943, 1944a, 1944b, 1948, 1949a, 1949b) and REMINGTON (1954), and the mechanism of it was clarified partly. This paper is a preliminary report on a study of hybrids between *C. eurytheme* and *C. interior.* *C. interior* is a more northern species than *C. eurytheme* which feeds upon the Sour Top Blueberry (*Vaccinium canadense*) and other *Vaccinium.* Recently the possible existence of hybrids between *C. interior* and *C. philodice* in the field was suggested (Hovanitz 1949b), and later a female, combining the characteristics of *interior* and *philodice,* was taken near Cheboygan, Michigan, June 29, 1951, with a large number of typical specimens of *interior;* Dr. A. B. KLOTS suggested that it must be a hybrid (Voss 1954).

MATERIAL AND METHODS

The process of obtaining intra- and interspecific matings of *Colias* which the writer used is the following. Healthy males, usually 6 to 12, are placed in the usual insect cage, of which its upper side is also of netting, under the sun, at 8:00-9:00 A. M.. New females usually emerge from late morning to afternoon. As soon as a female emerges, she is placed into the cage of males under the sun. A copulation usually takes place within 30 minutes, if it occurs, although it may occur much later occasionally.

About 500 pupæ of *C. eurytheme* and *C. philodice* were raised in the green house of the University of Notre Dame, in several insect cages, 30 cm. cubed. White Clover was used as a food plant. These pupæ were brought to the Biological Station, University of Michigan, Cheboygan, Michigan, on June 28, 1954. Many females emerged between June 29 and July 9.

Matings were tried in the above mentioned way, at Mud Lake and at Elliot's Creek, where *C. interior* is usually found, and outdoors at the Biological Station, using females of *C. eurytheme* which emerged at the laboratory and wild *C. interior* males which were collected at Mud Lake or Elliot's Creek. Females emerged within 24 hours, and pupæ which were just about to emerge were brought to Mud Lake or Elliot's Creek. *C. interior* males were placed in the cage of females as soon as they were collected. Usually 6—12 males and 6—12 females were in the cage at a time. Both *interior* males and *eurytheme* females were exposed at least for 2 hours under the sun. *C. interior* males were active only under the bright sun in the cages, as in the field. About 70 males of *interior,* in all, were used for matings on two afternoons at Elliot's Creek, two afternoons at Mud Lake, and four mornings and two afternoons outdoors at the Station. Only at Elliot's Creek, where two bright afternoons were spent in the effort, did the *interior* males readily try to copulate with *eurytheme* females. On the second afternoon at the Creek (July 9), one *interior* male, caught several minutes before, copulated from 2:08 to 3:15 P. M. with an orange *eurytheme* female which had emerged within 30 minutes. Mating outdoors at the Station was tried, with mating between *eurytheme* females and males as a control. Although a total of 13 matings were obtained between *eurytheme* females and males during the period without any difficulty, no mating between *eurytheme* females and *interior* males was obtained during the same period.

The females which were used for the matings were of the species *C. eurytheme,* either the white or orange forms. Some of them might have had a series of *C. philodice* genes, because they were the progeny of the wild *eurytheme* females which were caught in a place where *eurytheme* and *philodice* were both abundant. But the majority of these were phenotypically *eurytheme.* It was impossible to use *philodice* for mating, because almost all of the *philodice* adults emerged before any *interior* was found in the field.

RESULTS

The orange female of *C. eurytheme* (W. 15. 62) which was mated to *C. interior* laid eggs on the leaves of White Clover at Notre Dame. Thirty-two eggs were laid on July 12 (group A), 25 on July 13 (group B), 26 on July 14—20 (group C). Less than 10 eggs (between 6 and 9) were excluded from the above count because they failed to turn red and were presumably infertile. One of the causes that eggs failed to turn red was observed to be sucking by small insects or arachnids. Towards the end of egg laying, there is also a possibility that the mother butterfly did not receive enough sperm from the *C. interior* male. It is difficult to determine the egg fertility under this condition, but even if it is presumed that all eggs which did not turn red were non-fertile, the percentage of non-fertile eggs is about 10%, because the total number laid was about 90.

Groups A and B were bred in the greenhouse, and group C was bred in a special growth room which was kept at 75° F., 75% relative humidity, and 10 hours fluorescence light illumination per day. The eggs from intraspecific matings of *C. eurytheme* were raised at the same time in both places as controls.

None of the fertile eggs died before hatching in groups A and B, and only a few died, just before hatching, in group C. No deaths of larvæ were observed in the first and second instar stages in any of the three groups.

From group A, 26 hybrid males emerged in 6 days (August 8—13). The growth rates of these males equalled the growth rate of 8 control *C. eurytheme* males which emerged from August 10 to August 18. But the growth rate of the other six larvæ of group A was extremely slow. Although one of them continued to grow and emerged as a female on August 26 (control—11 *C. eurytheme* females from August 9 to 17), the others stopped growing at the 3rd or 4th instar.

Sixteen pupæ were obtained from group B with the ordinary growth rate. Ten males emerged from these, while six were kept in the refrigerator. (These six pupæ died before winter in the refrigerator.)

Including groups A and B, 15 larvæ of the 3rd and 4th instars were counted on August 24. None were feeding. Nine of these larvæ were refrigerated from August 24 to August 31, and removed to the greenhouse again. They did not begin to feed and died one by one, as did the other six which were not refrigerated.

The larvæ of group C, in the growth room, grew at the same rate as the controls until the 3rd instar, but they stopped feeding at the 3rd instar (a few in 4th instar) and remained largely motionless for about 10 days at the beginning of August. They were removed to the greenhouse on August 17. They were kept in the greenhouse only during daytime, when the temperature was 80° to 100° F., and were removed to the growth room at night to prevent chilling. After this was repeated for several days, they began to feed again one by one from August 21 to 23. After the evening of August 24, they were kept in the growth room continuously. Because of this non-feeding stage, the first larva of the hybrids entered the 5th instar 22 days later than the first one of the *C. eurytheme* controls. By August 24 the number of larvæ had decreased to 12 from the initial number of 26 eggs. The first butterfly emerged on September 5 and the last one on October 2. The total number was 10, and all were males. The other two seemed to grow very slowly but they died around the middle of October, without reaching 5th instar.

From the control brood which was raised in the growth room, 13 males emerged from August 11 to 19, and 8 females emerged from August 14 to 19.

There was only one prominent difference observed in the shape or coloration of egg, larva, and pupa of the hybrids in comparison with the control (*C. eurytheme*). This difference is in the larva. At the 4th instar, the hybrids showed a crimson line along the spiracular fold, but not so bright, while *C. eurytheme* had a white line. At the 5th instar, the hybrid larvæ showed a very clear crimson line, but *C. eurytheme* showed an orange line. This might be an expression of intermediacy of larval coloration, since *C. interior* larvæ have a bright crimson line.

The size of adult male hybrids raised in the greenhouse is the same as for *eurytheme* which emerged in the greenhouse during the same period. The pterine coloration was intermediate between *eurytheme* and *interior,* namely slightly orange. The orange pigment is distributed over most of the upper side of both wings. The individual variation of intensity of orange coloration is very slight among the 26 males. The color grade [9 (=most red)—0 (=yellowest) of HOVANITZ] is 5, and rather closer to 4 than to 6. Submarginal dark spots (lacking in *interior* but present in *eurytheme*), and the dark spot on the costa of the hind wing (usually lacking in *interior* but present in *eurytheme*) exists in the hybrid, and the discocellular spot on the hind wing in the hybrid is double (single in *interior* and usually double in *eurytheme*). These characters are uniform among the 26 hybrid males, and all of these spots are comparatively weak in comparison with similar spots of *eurytheme.* The author did not examine the color grade of control *eurytheme* in the greenhouse, since no reduction from typical *eurytheme* was found by simple checking. It will be possible to examine them in detail, because the samples are being saved.

Unfortunately the one hybrid female failed to extend her wings. Melanin coloration and the shape of the tip of the abdomen expressed clearly the female character. Though it is very difficult to decide the orange color grade, it seems to show intermediate coloration. All of the larvæ of F_1 hybrids which showed the ordinary growth rate emerged as males. These made up more than half of the F_1 population. Only one of the larvæ with the slower growth rate emerged, and this was a female. Hence it may be that all or most of the slow-growing larvæ were females.

The characteristics of males which were raised in the growth room are as follows. The size of these males was smaller than that of the males which emerged in the greenhouse, but they were equal in size to the *C. eurytheme* controls. The orange color grade was mainly reduced to 3 (8 of grade 3, 1 of grade 4, and 1 of grade 5). The differences in melanin coloration between males raised in the greenhouse and males raised in the growth room were approximately the same as the differences between the typical *C. eurytheme* male and its cold weather form (Klots, 1951). Orange color grades of the control *eurytheme* in the growth room are the following: 7 grade 9, 2 grade 8, 2 grade 7 males and 5 grade 8 females. The reduction of orange color toward the tip of the fore wings of the upper side is somewhat prominent. A part of this brood which was raised in the greenhouse was typical *eurytheme.*

Hybrid males were very active in the cages and copulated readily with orange *C. eurytheme* females. Six backcrosses were obtained within 4 days (August 9 — 12). About 12 females of orange *eurytheme* and about 20 hybrid males were used in the backcross attempts (according to my usual procedure). Three of the above females laid eggs (W.17.22.3, W. 17.22.7, and W.17.23.4), while the other three females died without laying eggs about 10 days after their copulation. W.17.22.3 laid about 140 eggs on the leaves of White Clover, and the fertility of these eggs was about 91%; W.17.22.7 laid about 90 eggs on the leaves of Alfalfa, and the fertility of her eggs was about 98%; and W.17.23.4 laid more than 50 eggs on the leaves of White Clover, but all of them failed to turn red and dried up.

The progeny of W.17.22.3 was divided into 2 groups, designated D and E. Group D was raised in the greenhouse and group E was raised in the growth room from the first instar stage, under the same conditions as the F_1. White Clover was given to both groups as a foodplant. The progeny of W.17.22.7 was raised in the greenhouse on Alfalfa. The growth rate of the majority of backcross larvæ was the same as that of *C. eurytheme* larvæ which were bred as controls, but a few were very slow like the F_1 hybrids, though no larvæ stopped feeding. In this case the females emerged at the same time as the males, but the butterflies which emerged latest were all females.

DISCUSSION

Since *C. interior* has only one generation a year and has a diapause in the young larval stage, it is difficult to rear, and wild *interior* males were used for the first hybridization trial instead of laboratory bred males. The difficulty of obtaining matings between *C. interior* and *C. eurytheme* is considered rather natural, since this mating is interspecific.

Although the *interior* male which mated with *eurytheme* has very clear characteristics of *interior,* a doubt remains concerning its identification, since the difference between males of *interior* and *philodice* is rather slight. Repetition of the experiment is required for assurance, but the peculiarity of the life history of the hybrid gives good support for considering it *interior.* The hybrid larvæ entered the non-feeding stage at a high temperature (75 degrees F.). This can be considered as either the inheritance of a character related to the northern range of *interior,* or a peculiar character of this kind of hybrid. Larvæ of *philodice, eurytheme,* and of hybrids between *philodice* and *eurytheme* had no diapause in the growth room under the same conditions under which the hybrids between *eurytheme* and *interior* were raised. The long emergence period of the backcross broods might also be a peculiar result of this hybrid crossing, though in this case, the decrease of density of larvæ in the cage may be a cause of it.

C. interior is a *Vaccinium*-feeding species. Therefore, the possible deleterious effects to the hybrid from a White Clover diet must be considered for all results, in spite of the low mortality of the hybrid larvæ in the young stage and the production of fertile hybrid males.

Studies of the characteristics of the backcrossed individuals and their progenies have been made. However, these data are not conclusive and are not presented in this report.

SUMMARY

1. One hybrid mating was obtained between a *Colias eurytheme* orange female raised at Notre Dame, Indiana, and a *C. interior* male collected in Cheboygan County, Michigan.

2. From the eggs from this female, 46 males and 1 female emerged as imagines.

3. Orange coloration intermediate between the deep orange of *C. eurytheme* and the yellow of *C. interior* was observed in the hybrid males.

4. The hybrid larvæ entered a non-feeding stage in the third instar under conditions of 75° F., 75% RH, and 10 hours fluorescent light a day. They began to feed again in the hot greenhouse.

5. Presumed females of the hybrids entered a non-feeding stage in the greenhouse also and failed to survive the non-feeding stage (except one female which emerged).

6. The hybrid males were at least partly fertile, and progeny were obtained by backcrossing to *C. eurytheme* females.

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STOCKARD, University of Michigan Biological Station, for facilities given; to Dr. W. HOVANITZ for the orange color grade sample of hybrid *eurytheme-philodice* and for his advice; to Dr. E. G. VOSS for his help in making crosses at Cheboygan and for his advice; to Dr. A. E. BROWER, Dr. J. H. GEROULD, Dr. H. B. HUNGERFORD, Dr. A. B. KLOTS, Dr. T. KOMAI and Dr. C. L. REMINGTON for their advice; and to Mr. W. F. WARD for taking care of the food plants at Notre Dame during the author's experiment at Michigan.

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NOTES ON *PARABASIS PRATTI,* A "MISLAID" NOTODONTID FROM NEW GUINEA

by HARRY K. CLENCH

When BETHUNE-BAKER (1904: 429, pl. 4, fig. 26) described the new genus and species, *Parabasis pratti,* from Dinawa, British New Guinea, he placed it, for some unaccountable reason, in the family Noctuidæ. It was so listed in the *Zoological Record* for 1904 (SHARP 1905: 267), but appears subsequently to have been nowhere referred to. GAEDE (1934) does not mention it in his catalogue of the Notodontidæ, nor does he (1930) list it in SEITZ. It is apparently not mentioned in any of HAMPSON'S volumes on the Noctuidæ (*Cat. Lep. Phalænæ*).

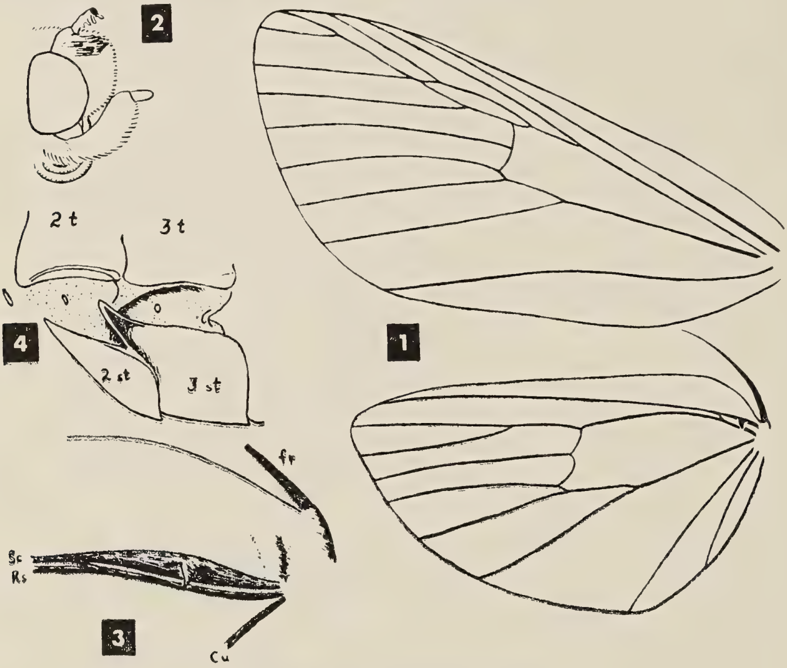
While arranging some Indo-Australian moths in the museum collection I found a pair of this striking and unmistakable insect: two males, one in excellent condition from the Kwimi River, S. of Hollandia, Dutch N. Guinea, 14.iii.1937 (W. STUEBER); the other, somewhat worn, from Uskwar, Bewani Mts., nr. Hollandia, 7.iii.1937 (STUEBER). These two differ from BETHUNE-BAKER'S excellent colored figure only in minor particulars.

Some years later, JOICEY & TALBOT (1915: 300, pl. 12, fig. 11) described a second species, *felixi,* from two males and a female from the Angi Lakes, Arfak Mts. (Vogelkop), 6000 ft., Dutch N. Guinea. These authors failed to indicate in any way the family to which *Parabasis* belongs.

It may be useful to redescribe the important structural characters of this genus, since BETHUNE-BAKER'S description is too brief to be of much service. The following description, of course, is based on *P. pratti* and refers only to the male. The female appears to remain unknown.

Antennæ equally bipectinate to within about 20 segments of the tip, the longest rami about the length of four shaft segments; thence to tip, simple; shaft scaled dorsally, the rami unscaled. Antennal scape rather large, dorsally convex, lateroventrally excavated as a sort of eyecap, with a tuft of long hairs ventrally and mesially; the scape is black dorsally, yellow ventrally (not "with black sockets" as described by BETHUNE-BAKER). Palpi (fig. 2) densely scaled, upturned to below upper border of eye, the second segment long and sigmoid, the last segment short, deflexed. Proboscis present. Vertex and frons (fig. 2) densely covered with long, nearly erect scales. The legs are subapressedly scaled, save for the femora which all have ventral fringes of erect hair-scales or scales. The fore leg has a lateral tuft of very long hair-scales, apparently arising on the trochanter and extending to the apex of the femur, which has a subapical dorsal transverse fringe of curved scales grasping the end of this tuft something after the fashion of a retinaculum. The hind tibia has two pairs of spurs of very unequal length, the inner spur of each pair being over twice as long as the outer, and nearly half as long as the tibia itself.

The venation is illustrated in the accompanying cut (fig. 1) and needs no further discussion, save for one point. In BETHUNE-BAKER'S description appears the following: "close to the base of 8 [Sc] a short sharp spur is emitted at right angles to the vein." Unless a specimen is examined this is almost certain to be misinterpreted as a costad-directed spur vein or supernumerary vein. This, however, is not at all the case. The spur he mentions is a most singular structure (fig. 3), which leaves at right angles (or nearly so) to the lower surface of the wing itself, almost immediately curving posteriorly and ending in a sharp point. It is heavily sclerotized and almost completely hidden in the basal scaling of the under surface of the wing. It becomes visible on wetting the wing for venational study, but is best studied dry, when the scales around it can be carefully scraped away with a needle. The purpose of this curious structure remains unknown to me, though JORDAN (1923: 154) offers some interesting possibilities in his discussion of the notodontid cteniophore. He observed it, apparently usually or always in association with the cteniophore, in a number of different species of the family.



EXPLANATION OF FIGURES

Parabasis pratti Bethune-Baker, male.
Fig. 1. Venation.
Fig. 2. Profile of head.
Fig. 3. Detail of base of hind wing under surface, to show the erect hook arising out of the base of vein Sc.
Fig. 4. Second and third abdominal segments, viewed from the left, showing the cteniophore arising from the third sternite.

The cteniophore of JORDAN (*loc. cit.*) is well developed in *Parabasis pratti* (fig. 4). but presents several peculiarities. First of all, it appears to be a process of the third abdominal sternite, rather than the fourth as JORDAN found in other notodontids. Second, it is not armed with any spines at all, making the term "cteniophore" a misnomer in this particular instance. It arises out of the anterodorsal corner of the sternite, and is straight, tapering, directed anterodorsally. Its posterior or dorsal edge is a continuation of the dorsal border of the sternite, and its anterior or ventral edge a prolongation of the anterior edge of the sternite. The cteniophore is laterally (or posterolaterally) excavated, forming a long trough-like pocket which extends down the anterior edge of the sternite, becoming shallower and eventually disappearing.

Immediately below the cteniophore, the second sternite (cf. fig. 4) is in lateral view very shallow, due to a ventral excavation of considerable proportions.

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A NOTE ON GENITALIC STRUCTURE

Some years ago I noted with only passing curiosity a reference by WARREN (*Trans. Roy. Ent. Soc. London* 1944: p. 9) to the fact that the eighth segment should be regarded as a proper part of the male genitalic apparatus. Others may be as surprised as I have been to learn that WARREN'S observation marks no mere academic theory, but that it is indeed advisable always to examine the eighth segment critically. Invariably, in the female anatomy, this segment is given over to modifications sexual in function, but I had presumed that almost invariably it is unspecialized in males. Recently, however, I made a preparation of an unknown butterfly species from Angola in which the segment is complexly elaborated and exceedingly bizarre. This male specimen additionally bore the full complement of parts on the ninth segment.

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NOTES ON *PIERIS VIRGINIENSIS* AND *ERORA LÆTA* — TWO BUTTERFLIES HITHERTO UNREPORTED FROM MICHIGAN[1]

by **Edward G. Voss** and **Warren H. Wagner, Jr.**

Once confused with *P. napi* Linné, *Pieris virginiensis* Edw., the "West Virginia White," is a rather rare and local species, heretofore known over an area extending from Ontario, New England, and New York, southward to North Carolina (cf. Merritt in Chermock, 1953). The butterfly has not previously been reported from the state of Michigan, although our present observations indicate that it occurs abundantly in certain localities in the northern part of the state. Once attention is called to this species and to the habits which distinguish it from the common Cabbage Butterfly, *Pieris rapæ* Linné, and the Gray-veined White, *P. napi,* as these species occur in Michigan, we believe that collectors in the state will discover localities additional to the five herein reported.

The collections of the University of Michigan Museum of Zoology contained only two Michigan specimens of *P. virginiensis,* both having been detected in 1955 in the series of *P. napi.* The earliest specimen taken in the state is apparently the ♀ captured over 40 years ago by T. H. **Hubbell** at Benzonia, Benzie Co., May 19, 1914. This remains the southernmost record in the state, being approximately one degree of latitude south of the other known Michigan localities, all of which are in the general vicinity of the Straits of Mackinac. In addition, the Museum collection contains a ♂ taken by **Sherman Moore** at St. Ignace, in the Upper Peninsula (Mackinac Co.) on May 21, 1922.

Recognition of this species in Michigan was first made on the basis of a specimen taken (**Voss**) May 15, 1954, in Emmet Co. The determination was confirmed by A. B. **Klots**, who wrote that he did not know of any authentic Michigan records. This specimen, a ♂, was taken in a very fine stand of mature beech-maple-hemlock woods ("Hastings Woods") on the southwest side of Crooked Lake (sec. 19, T35N, R4W), about six miles northeast of Petoskey. The day was cloudy, with intermittent light rain, and unfortunately no insect net was carried into the woods. However, several of the butterflies were seen, and the single specimen which was captured was taken by hand as it visited a blossom of *Trillium grandiflorum* (Michx.) Salisb., which was abundant in the woods. *Dentaria diphylla* Michx., although not yet in flower, was occasional, and is presumably the foodplant of this species in the region, as *D. laciniata* Muhl. is extremely rare in the county.

After the specimen was determined later in the season, it was naturally planned to return to the woods during the corresponding weekend the following spring. Two weeks earlier, however, on April 30, 1955, *P. virginiensis* was unexpectedly encountered (**Voss**) on a sandy woods road in Bliss Township, Emmet Co., about 20 miles north of the previous station. This locality is described in detail below under the discussion of *Erora læta,* which was found here when both of us visited the spot on May 14 — at which time *virginiensis* continued to be common. Old fields and some young second-growth woods characterize the roadsides here, but *virginiensis* was found to be even more common in the deeper woods about one-half mile to the west of the spring-fed damp spot where the species was first noticed on the open road, particularly in the morning hours before noon. At this locality, no *P. napi* were observed. (We never did return to the Crooked Lake woods in 1955, having found so good a place elsewhere.)

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[1] This paper is a contribution from the Biological Station of the University of Michigan.

On May 15, 1955, a very large colony of *P. virginiensis* was discovered (WAGNER) in the Upper Peninsula in rich deciduous woods in the limestone region near the Daggett Fire Tower, in Mackinac Co. (about four miles south of the Chippewa Co. line and about 9 miles southwest of Pickford). This colony was of special interest in making possible a comparison between the habits of *P. virginiensis* and of *P. napi,* the two species which were for a long time considered by many to be only varietally distinct. Field observations on their behavior wholly support the present generally accepted view that these are two distinct species.

The area near Daggett Tower is made up of rich woods strewn with dolomite boulders and criss-crossed by old lumbering trails. The dominant tree here is sugar maple, *Acer saccharum* Marsh., and the most conspicuous herbaceous plants in mid-May were *Trillium grandiflorum, Viola canadensis* L., and *Dentaria diphylla.* The dissected leaves of *Dicentra* and the large simple leaves of *Allium tricoccum* Ait. were prominent, but the flowers of the former had mostly fallen and those of the latter were not to be expected for another month.

Pieris virginiensis was extremely abundant in these woods and at all times during a period between 11:30 a.m. and 12:30 p.m. — even when the sky was somewhat overcast — there were several individuals in sight, flying through the understory vegetation. Along the main dirt road only rare individuals of *virginiensis* were seen, and these usually would alight in the damp spots. Practically all of the specimens were flying entirely within the deep woods — a habit conspicuously different from the imported *P. rapæ.* And when the occasional roadside specimen was frightened, it would fly straight into the woods, in contrast to the habit of *P. rapæ* of staying in the open. The minor lumbering trails in the woods were ideal collecting places, for they possessed muddy spots where individuals would land, in addition to providing access to the dense woods. However, the butterflies proved to be much less attracted to muddy spots here than to the flowers of *Viola canadensis.*

Pieris napi was observed at this locality particularly along the main open roads, usually gathered at wet spots. The differences between this species and *P. virginiensis* were obvious and conspicuous: *P. napi* has a bolder, swifter flight than *P. virginiensis;* in the latter the flight is slow and weak. The color of *P. napi* is much more chalky white; in *P. virginiensis* the appearance of the flying insect is grayish. At this time, the specimens of *P. virginiensis* were more or less worn and included both ♂♂ and ♀♀, while those of *P. napi* were fresh and nearly all ♂♂, suggesting that the first appearance of *napi* follows

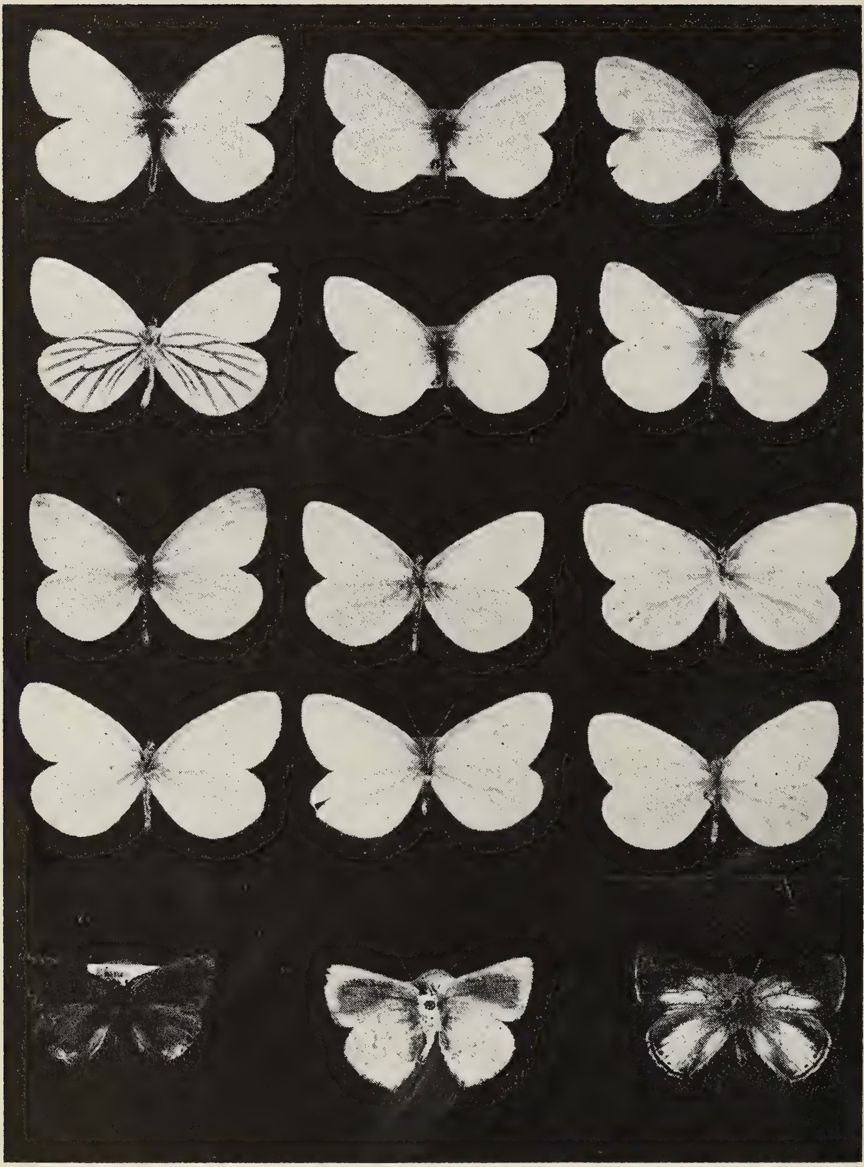

Fig. 1. Northern Michigan *Pieris* and *Erora* taken in 1955. All specimens show the upper surface except as specified.

TOP: left, *P. napi* ♂, Emmet Co., May 14; center & right, *P. virginiensis* ♀, Mackinac Co., May 15.

SECOND: left, *P. napi* ♂, under side, Mackinac Co., May 15; center & right, *P. virginiensis* ♂, Mackinac Co., May 15.

THIRD: darker form of *P. virginiensis* ♂, under side: left, Emmet Co., May 14; center, Mackinac Co., May 15; right, Emmet Co., April 30.

FOURTH: *P. virginiensis* ♂, under side: left & right, Mackinac Co., May 15; center, Emmet Co., April 30.

FIFTH: *Erora læta,* Emmet Co., May 14: left, ♂; center, ♂ under; right, ♀.

that of *virginiensis,* at least in this area, by perhaps one or two weeks. When taken, the specimens of the spring form of *napi* are strikingly differentiated by the bright blackish-green shading along the veins of the under side of the hind wings; in *virginiensis,* this shading is a diffuse gray. In some very dark specimens of *P. virginiensis*, the diffuse gray bands which follow the veins are nearly confluent, practically covering the entire wing surface with shading. (See fig. 1, third row.) At the time of these observations, the sky was intermittently cloudy and clear, and there had evidently been rain in the region during the previous night. The only other butterflies which were seen were a few specimens of *Lycænopsis pseudargiolus* Bdv. & Lec. and *Papilio glaucus* Linné.

As noted above, it was on a return to the Bliss Township, Emmet Co., station for *Pieris virginiensis* that we joined the fraternity of *Erora læta* Edw. collectors on May 14, 1955. Previously unknown from Michigan — or, for that matter, anywhere in the northern Great Lakes region — this exceedingly rare butterfly had been reported, often from only one or two specimens per locality, at scattered places from London, Ontario (type locality, 2 ♂♂ taken by SAUNDERS in 1861), Quebec, and Nova Scotia, southward to Virginia, Tennessee, and Kentucky (cf. Clark & Clark, Field, and Klots). It seems to have been most often taken in Vermont, and has recently (Hessel, 1952) been reported above timber line on Mount Washington, New Hampshire.

How many individuals we may have scared away in pursuit of *Pieris virginiensis* we do not care to contemplate; suffice it to say that VOSS, having taken adequate *virginiensis* at this locality two weeks before, was gathering small butterflies from a moist spot in the road — hardly consciously thinking of what they could be — *Erynnis,* perhaps. Indeed, the net included, among other things, an *Erynnis lucilius* Scud. & Burg. — and two ♂♂ of *Erora læta.* When it was recognized that *læta* had been found, WAGNER'S interest in *Pieris* a few yards down the road quickly waned, and within 30 minutes he netted a ♀ *læta.* Another ♂ was seen (and pursued) but not captured. The specimens were taken between 11:15 and 11:45 a.m. on a clear sunny day; no more were seen in the course of the next hour.

Our locality (see fig. 2) is scarcely the sort of "shaded trail" in beech woods where one is supposed to expect — if he ever dare expect — to find *læta.* A sandy "dirt" road faithfully follows a section line due east and west over the north-facing slope of a morainic hill the crest of which is slightly to the south (to the left in the figure). Therefore, although the road itself, as figured, rises to the west, the general slope of the land is north-facing. A moist spot along the south side of the road (toward which WAGNER is pointing his net in the figure) is kept damp until late summer by a small, apparently spring-fed pool in the shrubbery to the side of the road. In the valley to the north of the road (off the right edge of the figure) are scattered shrubs, small trees, and brush — evidently an abandoned field. On the slight rise to the southwest of the moist spot (behind the trees showing in the figure) is an abandoned apple orchard; presumably there was once a dwelling here, for there are small lilac bushes (not in flower) and plants of a cultivated species of *Phlox* (in full bloom). Directly south of the moist area, and also on the opposite (north) side of the road several yards to the east, the vegetation is a very young deciduous woods, apparently arising in large part from vegetative re-growth after cutting. Immediately along both sides of the road itself are young sprouts and suckers of assorted deciduous trees and shrubs, among which the following predominate: Sugar Maple, Basswood, American Elm, White Ash, Pin Cherry, Willows, and Blackberries. Several of the common introduced grasses and other weeds are included in the herbaceous vegetation along the roadsides. Although there is no Beech in the immediate vicinity of the moist spot, this species does occur in the woods not far away. No Hazelnut (*Corylus*) was noted anywhere near (either in the spring or on a later July visit to the site with A. B. KLOTS and F. H. RINDGE), and conifers are conspicuously absent.

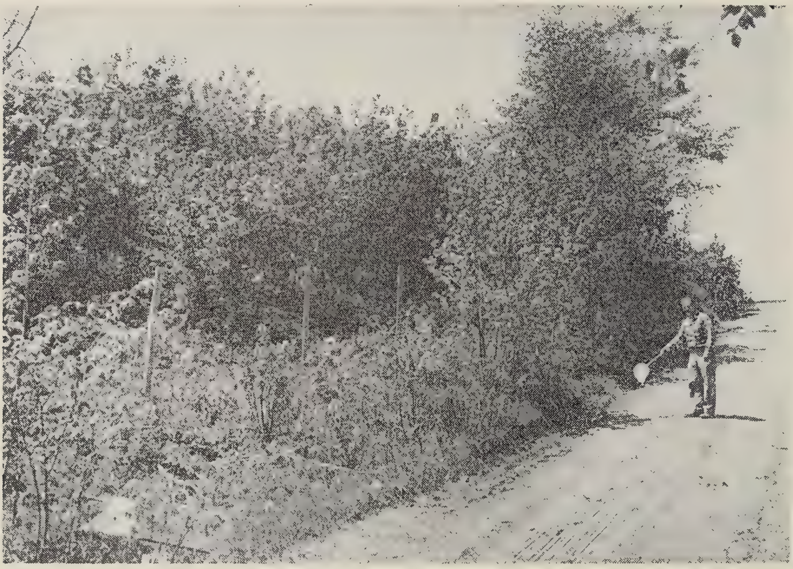

Fig. 2. The roadside habitat in Bliss Township, Emmet Co., Michigan, at which both *Pieris virginiensis* and *Erora læta* were taken, May 14, 1955. Looking somewhat south of west (the road goes due west).

The specimens are shown at the bottom of figure 1: two ♂♂, slightly worn at the tips of the primaries, and a perfect ♀. Although on the upper side the ♂♂ are an excellent match for published figures (*e.g.,* Holland, pl. 29, fig. 23; Klots, pl. 16, fig. 14), on the underside of the primaries the smoky or fuscous clouding is distinctly more extensive than in previously published figures. (This is absent in our ♀.) There is apparently no evidence of such clouding shown in HOLLAND'S ♂ (pl. 29, fig. 24), CLARK & CLARK'S ♀ (frontis. fig. 8; pl. 12, fig. b, the latter also as fig. 71 right, on p. 65 of CLARK, 1940), or FERGUSON'S ♀ (pl. 2, fig. 4, p. 331). There is a suggestion of this clouding in the ♂ figures of KLOTS (pl. 16, fig, 14, p. 129), EDWARDS (Thecla I, fig. 1), and CLARK, 1932 (pl. 25, fig. 6 |stated to be from Prescott, Ariz., and therefore referable to

E. quaderna]). EDWARDS' figure of the under side of a ♀ (fig. 4) indicates less clouding than in the ♂, and such a sex difference is implied in his text. The original description (Edwards, 1862, pp. 55-56) is unaccompanied by an illustration, but does describe the disc of the primaries beneath as "smoke color" obscuring the latter two red spots. It is of interest to recall that the type locality, London, Ontario, is the previous northwesternmost record. The under side of a ♂ figured by FIELD (pl. 1, fig. 7) comes closest to resembling our darkest specimen in this respect (see under side in fig. 1).

For the sake of a more complete evaluation of published figures of this rare species, reference may be also made to SCUDDER, whose unsatisfactory, uncolored figure (pl. 14, fig. 9) of the under side of a ♀ indicates none of this gray clouding; and to SEITZ, whose very poor depiction (pl. 155) of the under surface shows no clouding but indicates a decidedly pink, rather than greenish, ground color.

The two counties, Emmet and Cheboygan, which share the northernmost tip of the Lower Peninsula of Michigan constitute the area under special consideration by the University of Michigan Biological Station (located on Douglas Lake, in Cheboygan Co.). A recently published enumeration (Voss, 1954) of the butterflies found in these two counties cited 74 species for the two-county region, of which 66 were known from Emmet County and 70 from Cheboygan County (as of the 1952 season). During the past three years, a number of new county records have been obtained. The 1953 season added three species to the Cheboygan Co. list: *Euphydryas phaeton* Drury, *Lycæna dorcas* Kirby, and *Polites manataaqua* Scud. The 1954 season added *Pieris virginiensis* to the Emmet Co. list. The 1955 season added *Euptoieta claudia* Cramer, *Erora læta, Glaucopsyche lygdamus* Dbldy., *Euchloe olympia* Edw., and *Erynnis lucilius* to the Emmet Co. list; and *Poanes viator* Edw., *Carterocephalus palæmon* Pallas, and *Atrytonopsis hianna* Scud. to the Cheboygan Co. list. (We are indebted to M. C. NIELSEN and J. H. NEWMAN for the latter two records.) Of these, the new records for the entire two-county area are *Euptoieta claudia, Euphydryas phaeton, Erora læta, Pieris virginiensis, Polites manataaqua, Poanes viator,* and *Atrytonopsis hianna.*

All of these records have been made available for inclusion in SHERMAN MOORE'S new annotated list of the butterflies of Michigan, now in press. The revised totals for the University of Michigan Biological Station region are now as follows: For the two-county region, 81 species; for Emmet Co., 72 species; for Cheboygan Co., 76 species.

We believe that for a long time to come, Emmet County will remain the only county in Michigan — or in the nation — in which have been taken fresh specimens of such diverse elements as *Cœnonympha tullia* Müller, *Euptoieta claudia, Nymphalis californica* Bdv., *Erora læta, Lycæna thoe* Guérin, *Eurema lisa* Bdv. & Lec., *Pieris virginiensis,* and *Hesperia laurentina* Lyman.

After completion of the present manuscript, our attention was called to the list of Lepidoptera in the Los Angeles County Museum by Martin & Truxal, published in

September, 1955. *P. virginiensis* is cited for Michigan in June and July. Believing that these late records may have been based on specimens of *P. napi,* we sent an inquiry, accompanied by a copy of the photograph reproduced as figure 1, to LLOYD M. MARTIN, who kindly checked the material carefully. He writes (Nov. 2, 1955): "I find we have one pair which agrees with the photograph . . . taken at Petoskey, Michigan, June 19, 1915 . . . by J. J. LICHTER."

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IN SEARCH FOR *PIERIS VIRGINIENSIS* IN MASSACHUSETTS

by WALFRIED J. REINTHAL

Following a friendly invitation from SIDNEY A. HESSEL I went with him on April 30th to visit the habitat of *Pieris virginiensis* Edwards in Washington, Connecticut. There is a dirt road running through a damp, decidous forest in a hilly area. A brook winds, with more or less dense scrubby vegetation, around this road. The foodplant of the species, *Dentaria diphylla,* grows locally in smaller or larger groups mostly on the banks of this brook, but also on the road sides in woods. At the time of our visit, only a few of the plants were in blossom. Shortly after we parked our car on the road side at 10.30 A.M. we netted the first male *virginiensis* a few yards from the road. We collected other specimens thereafter, which were caught on stream banks, in heavy brush, or on the road. At times it was not easy to follow the butterfly and handle the net in the dense vegetation. We stayed here for about one hour, then went to investigate some other places. Coming back we made a short stop at the same place in the early afternoon. The species was still flying at 2.30 P.M. All together we saw ten specimens, of which we caught six males and two females. Most specimens were fresh, and it seemed certain that they emerged that very morning, April 30th, 1955, since it was the first sunny day in that area after six days of rain.

My first acquaintance with the habitat and habits of this interesting species encouraged me to look for it in western Massachusetts. On May 14th I was on a collecting trip in the Berkshires, in the northwest corner of the state. It was a clear but cool day with a north wind. Along picturesque Highway 2 and in several seemingly good collecting spots nothing was flying, not even a *Pieris rapæ* Linné or *Colias eurytheme* Bdv. In some moist meadows where the *Vaccinium* was in full bloom, we expected *Incisalia,* but we did not see one. In the early afternoon it turned warmer and, discouraged with no results, we decided to pay a short visit to Wahconah State Park near Dalton before going home.

This park lies northeast of Pittsfield, Massachusetts, and occupies a wooded area where a stream falls into a gorge forming a little waterfall. My collecting guest that day, H. WILHELM from Willimantic, Connecticut, and I decided to try our luck here. As soon as we stepped down to the waterfall I got a butterfly in my net in a damp place along the path in the woods. To my surprise it was a male of *P. virginiensis.* Of course, a feverish and diligent search began immediately. Along a tiny stream running down a shady, woody slope, we found some patches of *Dentaria* in bloom, the foodplant of the species. And here we soon obtained a few other specimens some of which, however, turned out to be *Pieris napi* Linné. So both species flew here together in the same biotope. We soon depleted this tiny habitat after we caught a couple of specimens. We then turned our attention to the swampy forested area below the waterfall. There were two places where both the Pierids were flying. One was a steep woody slope with water running down in several tiny streams where in shade of some trees and bushes a few patches of foodplant were growing. Most of the area was densely covered by a growth of *Equisetum* about two feet high. Intermingling with this vegetation were also some nice patches of violets in bloom. Here a few *P. napi* and *P. virginiensis* were caught. The other place, even better, was a shady, swampy, deciduous woods at the foot of that slope, along the banks of a small stream. We noticed some small open spaces along the water where the sun found ready access and white flowers of *Dentaria* were waiting for the guests to feed upon. Both species were flying in these open spaces but also in dense brush and even on the steep woody slopes. The woods in this habitat were mostly composed of the following trees, predominantly in scrubby form: maple, birch, beech, hazelnut, linden, hemlock, and ash. Some more typical of the lower vegetation, besides the several species of ferns and the *Equisetum*, were: *Viola* sp., *Trillium erectum, Erythronium americanum, Arisæma triphyllum, Anemone quinquefolia, Asarum canadense, Tiarella cordifolia, Sanguinaria canadensis,* etc. As mentioned above both species, *napi* and *virginiensis,* were thriving here together. Since no other representatives of the Cruciferæ family were noticed besides the Toothwort, the last one presumably formed the foodplant for both species.

At times our battlefield remained empty and not one "white" was on the horizon. Then suddenly a single specimen emerged from the vegetation or flew down the woody slope to feed upon Toothwort flowers. Its normal flight is slow, zigzagging a foot or two above the ground, stopping for a while on flowers or resting on the ground enjoying the sun. *P. virginiensis* is a rather "nervous" and jerky species. If disturbed it gets panicky and goes into an erratic flight, and at times it really soars. I have seen it fly as high as the tree tops or hasten up a steep woody slope. There was some opportunity in this place to compare both species in their habits, and it probably would not be wrong to say that their habits are quite similar, except that perhaps *P. napi* is more temperamental, more sensitive, and is more easily disturbed. When this happens it flies away fast.

Since it was getting cooler and darker in the afternoon we left Wahconah Park at about 4 P.M. The result of our mutual effort was: we saw about 20 *Pieris*, of which we collected one male and three females of *P. napi*, and one female of *P. virginiensis*. The *napi* were more fresh than *virginiensis,* the last one being on the wing, in my estimation, for about 7-10 days.

The next day I returned to Wahconah Park in the morning, hoping to have more luck with both species. I arrived at 9.30 A.M., but in spite of the sunny weather it was too cool and nothing was on the wing. I drove about one mile to Windsor Reservoir to look for some other species in more open, warmer surroundings. An inviting swampy meadow, with large patches of a low *Vaccinium* in full bloom, did not yield anything. The sandy hills on the other side of the road, where wild cherry was in full bloom and wild strawberry and *Glechoma hederacea* blossoms decorated the ground, remained lifeless. As I was walking back to my car along the sandy road, a *Pieris* came flying toward me. To my surprise it turned out be a fresh male of *virginiensis*, about one half mile away from its habitat in Wahconah Park, here in an open, sandy and meadowy terrain! General experience has been that the *virginiensis* does not go far out of its biotope in the woods, but evidently there are exceptions at times, as in this case.

Back in the Park again, I saw the first *Pieris* flying at noon. During one hour of collecting, I was able to catch only one male and one female of *napi,* and one male and two females of *virginiensis*, in addition to the above mentioned male obtained on the sandy road. I observed only a few more specimens but did not net any of them.

Leaving Wahconah State Park, I drove north of Pittsfield on Highway 7, seeking other likely places for *virginiensis.* I remembered two suitable habitats in that area from the previous autumn. Today I actually located two more places in Berkshire County where *virginiensis* were breeding and flying. After passing New Ashford, a little village on Highway 7, I noticed a large patch of Toothwort along the road in full bloom. Five or six specimens were flying above the flowers or feeding on them. The area consisted of swampy ground and was shaped like a triangle, about 40-50 yards long and 12-15 yards wide. It lay between a narrow creek and the highway which leads through a dense, shady, mixed type forest. In this triangle were a few shrubs and some other plants, not yet in bloom, and a dense growth of *Dentaria.* In spite of it being late afternoon, though still with enough sunshine, I collected about one hour and obtained eleven males and two females, rather worn specimens, of *P. virginiensis.* Later, after passing Lanesboro, on my way back to Pittsfield, I recognized a white butterfly crossing the road as being undoubtedly *virginiensis.* I failed to catch it but then started to look around for the place from which it could have come. After traversing a farm meadow 40-50 feet wide I discovered the possible habitat. It turned out to be a swampy, dense, and semishady brush where several small brooks criss-crossed each other, thus forming a number of small islands. Among the other plants growing in the swampy ground were violets in full bloom, a good amount of them belonging to the yellow-colored *Viola eriocarpa.* The Toothwort, *Dentaria diphylla,* grew in small scattered groups under the brush, mostly on the very edge of the small brooks. *P. virginiensis* were still flying here at 4:00 P.M. During my twenty minute stop I collected two males and two females, one pair of them *in copula.* The last one was frightened from a small bush of wild roses.

Lack of more time and good weather, together with the short flight period of the species, gave me little chance to look for more *virginiensis* this spring. I did, however, make one catch on May 30. While on my way home from a trip to Vermont, I made a short stop in the late afternoon on a dirt connecting road on the outskirts of Colrain, a small village northwest of Greenfield, Massachuetts. On this abruptly ascending road, bordered by a brook in a canyon, I unexpectedly netted a worn male of *virginiensis.* A brief search along the brook for the foodplant was fruitless, so I concluded the specimen evidently came from a more distant place.

The above brief observations of this interesting species convinced me that *virginiensis* probably has a wider distribution of localized habitats in western Massachusetts, since there are numerous suitable places in Berkshire County similar to those described in this article. This, of course, depends again on distribution of the foodplant to which this butterfly is closely bound. The short period of flight, no more than three to four weeks, certainly makes the study of this species more difficult for one who has to choose between a day off from work and a good weather favoring a field trip.

There remain a few words to be said about some experiences with the first stages of *P. virginiensis*. My partner, H. WILHELM, found one egg on Toothwort on our first trip on May 14 to Wahconah State Park where the species flew together with *P. napi*. The larva from this egg was raised to maturity on Toothwort, producing a female of *napi*, of second brood, which emerged from chrysalid on June 7. On June 16, Mr. WILHELM paid another visit to Wahconah State Park and in several hours of searching Toothwort leaves, he collected about three dozen or more of *Pieris* larvæ, about one-half to full-grown in size. He raised them to chrysalids, but only one female *Pieris napi*, belonging to the second brood of this species, emerged on July 6. All other chrysalids are hibernating at this time and will probably produce butterflies in the spring of 1956. Whether they all turn out to be *virginiensis* is uncertain. However, assuming a part of the chrysalids collected are *napi*, some of them should have emerged in the fall of 1955 as the third brood of *napi*.

On June 17 I went to check my habitat of *virginiensis* near New Ashford in Berkshire County. It was not easy anymore to recognize the place as a biotope for this species. Last May, when the *Dentaria* was in full bloom, it was the most prominent feature of the vegetation in this habitat. But the place was now unrecognizably overgrown with man-high ferns and other plants. To find the fading remainder of the Toothwort in the luxuriant high vegetation, it was literally necessary to crawl into the dense growth and look very close to the ground. After working "on all fours" for a good two hours, I was able to find only five *Pieris* larvæ. They were resting on the upper side of the green leaves of Toothwort and were five-eighths to one inch in length. Only about one-half of the Toothwort leaves were fresh and green. The rest were faded in color or entirely yellow.

The said five caterpillars were raised in a 14x19x10 cm. plastic box with a tight cover and a layer of cellucotton on the bottom of the box to absorb surplus moisture. One of the caterpillars was parasitized and died the next day. The others pupated from June 19 to June 21, two of them on the box wall (one in vertical and the other in horizontal position), and two on plant leaves. They are hibernating as this is written and presumably are *P. virginiensis,* since only this species was seen flying in New Ashford in May.

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A BIBLIOGRAPHY OF GENERAL CATALOGUES AND CHECK LISTS OF NEARCTIC RHOPALOCERA

by CYRIL F. DOS PASSOS

Introduction

While engaged in preparing a check list and a catalogue of the North American Rhopalocera, north of Mexico, it has been necessary to consult most check lists and catalogues dealing with that subject. In the belief that it would prove useful to students to have the references to such publications gathered together in one paper, this bibliography has been compiled, the arrangement being chronological.

At the outset we are met with the apparently simple questions — 1) What is a check list? and 2) What is a catalogue? They will be considered in that order.

WEBSTER (1947, p. 458) defines a [scientific] check list as "A list, usually alphabetic and numbered, of species, genera, etc., for the convenience of collectors and students, usually limited to a given group, region, or collection." Implied in that answer or definition is the further thought that the list, to be of scientific value, should be systematic in form. While modern check lists are invariably systematic in composition, the earliest ones were often alphabetical. Today alphabetical or chronological lists would be of little value to a systematist, and the former could be considered little more than in index to the names. Appended to a check list is often found an index, especially in modern times.

WEBSTER (1947, p. 420) defines a catalogue, insofar as material, as "A list or enumeration of names, titles, or articles arranged methodically, often in alphabetical order and usually with descriptive details, ..." A catalogue then is an expanded check list of the scientific names of insects intended to be used for their systematic study. It too should be arranged systematically rather than alphabetically or chronologically, and for the same reason. It is often followed by an alphabetical index. The enlargement of the check list into a catalogue is accomplished by the addition of references to 1) the original description of each insect, 2) its distribution, and 3) its synonymy. The first two pieces of information are usually present in a catalogue, but the synonymies may or may not be present without affecting the classification of the work as a catalogue.

It is sometimes difficult to draw a line between what is a catalogue and what is a revision. The title of the publication is not controlling always. Whenever doubt has arisen in the author's mind, it has been thought best to include those publications concerning which there may be differences of opinion. In a sense, many of the scientific publications of the Eighteenth Century, such as those of LINNÆUS and FABRICIUS, were catalogues, designed as they were to list all known animals and plants, and in many cases giving references to their original descriptions and habitats. However, such works were much more than catalogues, because they described animals and plants, often as new to science. Hence, they are not deemed to have any place in a bibliography of catalogues.

It is possible that at one end of the scale (check lists) too much has been included by taking into the bibliography HÜBNER'S *Index exoticorum Lepidop-*

terorum (1821) *and his Systematisch-alphabetisches Verzeichniss* (1822), while at the other end (catalogues) something has been omitted by leaving out DUPONCHEL'S *Catalogue méthodique des Lépidoptères d'Europe* (1844), DOUBLEDAY and WESTWOOD'S *Genera of diurnal Lepidoptera* (1846-1852), WYTSMAN'S *Genera Insectorum* (1902- . . .), and similar works.

If we place check lists at one end of the scale in dealing with these three kinds of scientific publications, the intermediate position would undoubtedly be occupied by catalogues, and the other end by revisions. While the line dividing check lists from catalogues is easily drawn, the demarcation between catalogues and revisions is sometimes difficult to draw, the former sometimes being partly revisionary in character in spite of the title they may bear (*i.e.,* Systematic catalogue of *Speyeria*). Check lists and catalogues should not be revisionary in nature, although a few revisionary notes may be included properly. That function should be reserved for revisionary works. Thus the DOS PASSOS & GREY (1947) work cited above could more properly have been entitled a revision of *Speyeria,* since that is its inherent nature and purpose, but is included in the bibliography because of the check list of *Speyeria* that it contains.

Many catalogues and check lists include both Rhopalocera and Heterocera. The latter, while not relevant to this paper, have been included sometimes in the collations, if contained in the same volume or part thereof as the Rhopalocera. One world-wide catalogue (of STRAND) deals with families or subfamilies of the Rhopalocera that are not represented in North American. Such families or subfamilies are omitted insofar as possible, but when contained in a volume or part dealing with families or subfamilies that are represented in North America, they have been included. The theory followed in general is that it is better to include in this bibliography too much rather than too little.

While we are interested primarily in general check lists and catalogues of butterflies occurring in North America, north of Mexico, including Greenland, some of those insects have a circumpolar distribution. After all, Nearctic and Palæarctic regions are merely man-made terms. It is necessary, therefore, to cite also in the bibliography not only the strictly Nearctic works but also all general Palæarctic check lists and catalogues that refer to those circumpolar insects. While this lengthens the bibliography somewhat, it is hoped that it will add greatly to its value.

Included also are a few lists of large areas of North America, such as New England, the eastern and western regions of the United States, and those relating solely to the preparatory stages of the Lepidoptera. Perhaps some of the former may not be considered general catalogues. Similar liberty has been taken by the inclusion of somewhat localized lists or catalogues of the Scandinavian fauna, but on the other hand, lists and catalogues of European countries, such as WHEELER'S *Butterflies of Switzerland* (1903), ZERKOWITZ'S *Lepidoptera of Portugal* (1946), and AGENJO'S *Catalogo ordenador de los lepidopteros de España* (1946-1947), have been excluded as not sufficiently general.

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[1] This synopsis is often found bound in at the back of *The butterflies of North America,* series 1, with the same pagination. Apparently either reference would be correct.

[2] This check list was issued to subscribers in parts with volume 4, numbers 5-10 (1881-1882) of the *Bulletin of the Brooklyn Entomological Society,* but paginated separately. It was also issued and sold with a title page dated 1882.

[3] This list of species was issued separately with 16 unnumbered pages, but is often found bound in at the back of *The butterflies of North America,* series 2, with pages numbered [343-358]. Apparently either reference would be correct.

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Conclusion

All of the foregoing works have been examined personally, with the exception of three by HEYDENREICH, none of which is available in the Library of the American Museum of Natural History. The collation of those publications has been taken in part from the Catalogue of the books, manuscripts, maps and drawings in the British Museum (Natural History) (1903-1940), and the Index Litteraturæ Entomologicæ by HORN & SCHENKLING (1928).

If any omission in the foregoing list (and there must be some) is found by a reader, the author would appreciate being informed thereof.

At some future date it is hoped to publish a somewhat similar bibliography of local lists of butterflies of North America, arranged by Canadian Provinces and States of the United States of America, a card index of which has been maintained for a number of years.

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Washington Corners, Mendham, N. J., U. S. A.

ON THE LIMITING OF SUBSPECIES

by WILLIAM T. M. FORBES

In his recent discussion (*Lepid. News* 9: 1; 1955), VAN SON proposes to solve the question "what is a subspecies" by excluding all the problematic cases and limiting the term to the relatively small group where physical barriers are definite, sharply marked, and can be considered complete. It is true that the persons who have put the most emphasis have been chiefly those who are working on species with interrupted distributions, but in fact the great majority of species fall into the other category, for the major part of the habitable earth is not cut into sharply defined areas but is formed of the broad continents. And even where there is probably a complete barrier, there may often be no subspecific difference. Thus the isolated colony of *Carterocephalus palæmon mandan* Edw. at McLean, N. Y., appears no different from the population further north, — at least no one has tried to make a subspecies of it; yet the latter is the eastern end of a cline which becomes true *palæmon* at its western end in Europe. And the many isolated colonies of *Euphydryas chalcedon* which HOVANITZ studied in southern California, show minute racial differences, each from each, yet as a whole form a couple of clines at an angle to each other.

If we treat cases of this sort as clines rather than isolates in spite of their actual physical isolation, we will have very few true subspecies left. And it seems to me hardly worth while to make a separate category in nomenclature for such relatively rare cases as *Papilio ophidicephalus* Oberthur.

Dr. VAN SON'S difficulty, — that the size of subspecies becomes arbitrary in the case of a species with continuous distribution, — is not at all unique at this level, but applies equally to all the units of classification save only the species; for the size of all alike is purely arbitrary, and we have had always the same difficulty in agreeing on a proper size. Thus I have seen subfamilies suggested in the Lycænidæ which I should personally consider very good subgenera, perhaps weak genera. And the *Heliconius* group is a clear concept in classification whether we include or not *Cethosia* and *Dione,* and whether we call it a family or merely an aberrant series of Argynnines.

The real problems as I see it are in quite another direction, and basically in the attitude of the Code, rather than this slight inexactitude. Firstly if subspecies are anything, they are statistical, and should be based only on substantial blocks of material, yet the Code provides they must be based on holotypes, not on blocks of cotypes; secondly in the great majority of cases they are in fact clinally connected, yet by chance the type locality may turn out to be at the blend-point of otherwise pretty well defined populations, with the result that the races may appear much less tangible than they are in nature. (Lakehurst, New Jersey, and Surinam are frequently such blend-points.) Thirdly the Code limits the machinery of the "trinomial" to subspecies as now defined, while other types of variation are in many cases definitely more important and more worthy of names. It would seem that they were originally singled out on the assumption that they were the source of speciation. I have never seen any evidence presented to support this assumption; personally, I believe it only a minor source of new species (as against other isolating mechanisms, chiefly biological), and consider this feature of the Code a great hindrance to sound biological thinking.

I should personally suggest, then, some very different reforms: 1) recognize no holotypes of subspecies, but consider subspecific names based only on the whole block of material on which they were originally defined; 2) find some means of allowing a shift of "type locality" where the actual locality turns out to lie in a blend-zone; 3) redefine "trinomial" to include all nameable units below species and recommend the insertion of a vernacular word between the species and variety name to indicate the category of variety (as believed by the given writer); — this interpolated word not to be considered part of the name and to be changed as needed by increased knowledge.

Thus for instance we have the Green Swallowtail: *Papilio philenor,* and the lower name *hirsutus.* This latter is now considered the California race; in fact the hirsute condition is an early spring one both east and west, but it happens that early specimens are rare in the east, and the late ones rare and very local in the west. So I consider it a personal matter whether one writes "*philenor* spring form *hirsutus*" or "*philenor* race *hirsutus*".

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Bishop SKAT HOFFMEYER, of Aarhus, Denmark, lectured on biology of Danish Lepidoptera to the New Haven Entomological Society in October 1954, while visiting the United States. In the course of his engrossing talk, he told of an astonishing recent experiment by a Danish observer and kindly promised to send us the information for the *News* when it had been published. The note, by P. L. JORGENSEN, has now appeared, and the English summary sent by Bishop HOFFMEYER follows.

SUMMARY

ACANTHOPSYCHE ATRA LARVÆ HATCHED FROM BIRDS' EXCREMENTS

This paper describes a probable method of dispersal of Lepidoptera species with wingless females. It was observed that the females of *Acanthopsyche atra* L. (Psychidæ) leave their sacs a few days after pairing. They drop to the ground, where they are easily discovered by birds. Eleven of these fertilized females were fed to a captive Robin (*Erithacus rubecula*). Its fecal droppings from the following 24 hours were placed in a special cage. Once in a while they were sprinkled with water, and a fortnight later the first larvæ hatched from the droppings. In all, 30 — 40 larvæ were hatched, not a very big number, but enough to show that the species may be dispersed by birds in the way described.

C. L. REMINGTON

THE HONEY GLAND AND TUBERCLES OF LARVÆ OF THE LYCÆNIDÆ

by GOWAN C. CLARK and C. G. C. DICKSON

A considerable amount of data having been gathered concerning the honey gland and its attendant tubercles of larvæ of the Lycænidæ, it is presented here to help anybody studying this interesting subject. The honey gland is an orifice dorsally placed on the 10th segment, which is capable of exuding a liquid much sought after by ants. It is, in some, a simple transverse slit on the surface, in others the slit is sunken in an elliptical trough, and in others it is raised above the surface on an elongated mole, while another form is an elongated mole sunk in a depression. The gland is placed in the centre of the segment, toward the posterior edge, or is tucked away in a fold between the 10th and 11th segments. It is often protected by spined setæ. When the larva exudes a bead of liquid, the gland of most species unfolds into a bulge before the liquid appears.

The tubercles, if they are present, are situated on the 11th segment, one on each side, in the vicinity of the spiracle. In a primitive form, they may be present in the first instar or they may not appear till some later instar, while in a few they are only present in the final instar. The table on pages 38-39 indicates the range of variation in the honey gland and tubercle characters in South African lycænids.

In the South African larvæ studied, there are two forms of tubercles, (a) what may be called warning beacons, and (b) what are definitely whips. Two species at least which possess the former type, namely of *Castalius* and *Syntarucus,* use their tubercles as whips. In both of these the spines are long and, with the tubercle half extended, they form a stiff cluster with which the vicinity of the honey gland is dusted. In (b) the tubercles are encased in protruding cylinders the rims of which are, in most cases, provided with hard spines to protect the bristles of the tubercles which are too long to be totally withdrawn. The portion of the rim facing the honey gland usually has no spines or has very small spines so as to allow full freedom of action to the tubercle. Cylinders which rise well above the surface are capable of swaying from side to side to give a bigger dusting range. The tubercles are eversible rods which are forced straight out, then bent over. The spines, some placed on the end and some on the side, sweep a large area as they unfold.

When an ant wishes to "milk" a lycænid larva, it generally takes a stance on the dorsum and caresses the vicinity of the gland with its antennæ. The larva responds by exuding a bead of liquid, which the ant removes. After swallowing this it again caresses the vicinity of the gland until satisfied or driven away by the tubercles.

The warning beacon type of tubercles are generally very sluggish and are normally drawn below the surface of the skin, but when the larva is annoyed by the attentions of insects other than its accustomed ants, the tubercles are fully extended after a few nervous tremblings and half-threatening attempts. The tubercles remain in the fully extended state for about 3 to 4 seconds and are then withdrawn, but if the interference continues, out come the tubercles again. They can be operated independently. In some cases the tubercles may be made to extend by tickling the vicinity of the honey gland with a paint brush.

The whip type tubercles are all very active and shoot out in rapid determined flashes, one to two flashes per second, some slightly faster. When crawling about, the larva seldom has its tubercles completely dormant, and they are seen to be trembling in and out with occassional flashes as if in a state of nervousness or a warning to insects to keep away.

SPECIES	INSTAR OF FIRST APPEARANCE		NO. OF SPINES ON TUBERCLES (INSTAR)	
	GLAND	TUBERCLES	FIRST	LAST
Cacyreus lingeus Cram.	2nd	none	none	———
Cacyreus palemon Cram.	none	none	none	———
Cacyreus marshalli Butl.	none	none	none	———
Actizera stellata Trim.	3rd	3rd	?	16-20
Actizera lucida Trim.	2nd	3rd	?	?
Lampides bœticus Linné	3rd	3rd	?	20
Castalius melæna Trim.	penultimate	penultimate	?	36-40
Zizeeria knysna Trim.	penultimate	penultimate	?	24
Tarucus thespis Linné	2nd	3rd	?	18-20
Tarucus bowkeri Trim.	2nd	3rd	?	18
Tarucus theophrastus Fab.	2nd	2nd	?	24
Azanus jesous Guér.	2nd	3rd	?	30
Azanus moriqua Wallgr.	2nd	3rd	?	11
Azanus ubaldus Cram.	2nd	3rd	?	19-20
Syntarucus telicanus Lang	2nd	final	?	30
Syntarucus jeanneli Stpffr.	2nd	final	?	31
Lepidochrysops patricia Trim.	2nd	none	none	———
Lepidochrysops caffrariæ Trim.	2nd	none	none	———
Lepidochrysops methymna Trim.	2nd	none	none	———
Lepidochysops bacchus Riley	2nd	none	none	———
Lepidochrysops lacrimosa B. Bak.	2nd	3rd	?	?
Euchrysops dolorosa Trim.	2nd	3rd	?	18
Eicochrysops messapus Godt.	2nd	penultimate	?	20
Anthene otacilia Trim.	2nd	3rd	?	20-25
Anthene amarah Guér.	2nd	3rd	?	32
Anthene livida Trim.	2nd	2nd	?	20
Anthene lemnos Hew.	3rd	3rd	?	30-34
Anthene definita Butl.	2nd	3rd	?	18
Phasis sardonyx Trim.	?	1st	?	?
Phasis thero Linné	3rd	1st	?	11
Alœides aranda Wallgr.	3rd?	1st	4	?
Alœides almeida Feld.	3rd?	1st	6	?
Alœides pierus Cram.	3rd?	1st	6	15
Alœides thyra Linné	3rd?	1st	?	26
Alœides taikosama Wallgr.	3rd?	1st	10	10
Axiocerces bambana Gr.-Sm.	3rd	1st	?	5
Aphnæus hutchinsonii Trim.	3rd	1st	3	?

SPECIES	INSTAR OF FIRST APPEARANCE		NO. OF SPINES ON TUBERCLES (INSTAR)	
	GLAND	TUBERCLES	FIRST	LAST
Capys alphæus Cram.	4th	none	none	———
Deudorix antalus Hoff.	2nd	none	none	———
Deudorix diocles Hew.	3rd	none	none	———
Leptomyrina lara Linné	2nd	none	none	———
Thestor basutus Wallgr.	none	none	none	———
Thestor dicksoni Riley	none	none	none	———
Lachnocnema bibulus Fab.	none	none	none	———
Lachnocnema durbani Trim.	none	none	none	———
Durbania amakosa Trim.	none	none	none	———
Alæna amazoula Bdv.	none	none	none	———
Hypolycæna philippus Fab.	2nd	none	none	———
Epamera sidus Trim.	3rd	3rd	?	5 rows of 5-6
Epamera æmulus Trim.	3rd	3rd	?	18-20 rows of 8
Epamera mimosæ Trim.	final	final	—	40-45
Epamera alienus Trim.	2nd	3rd	?	40
Stugeta bowkeri Trim.	2nd	final	?	30
Argiolaus silas Westw.	2nd	2nd	?	75
Myrina ficedula Trim.	2nd	2nd	?	14 rows of 6
Myrina dermaptera Wallgr.	2nd	2nd	?	24 rows of 10
Pœcilmitis thysbe Linné	2nd	1st	2	8
Spindasis natalensis Dbl. & Hew.	3rd	1st	none	8
Crudaria leroma Wallgr.	2nd	1st	2	6

The majority of species illustrated have been studied with ants in attendance, and to obtain the detailed drawings larvæ have had to be killed in order to force out the tubercles for examination. The illustrations show: a semi-diagramatic view of the last four segments of the final instar; a scale drawing of the honey gland as seen from above; if present, the fully developed tubercles extended; and, where possible, the earliest form of the tubercle. All drawings are drawn more or less to one size for ease of comparison.

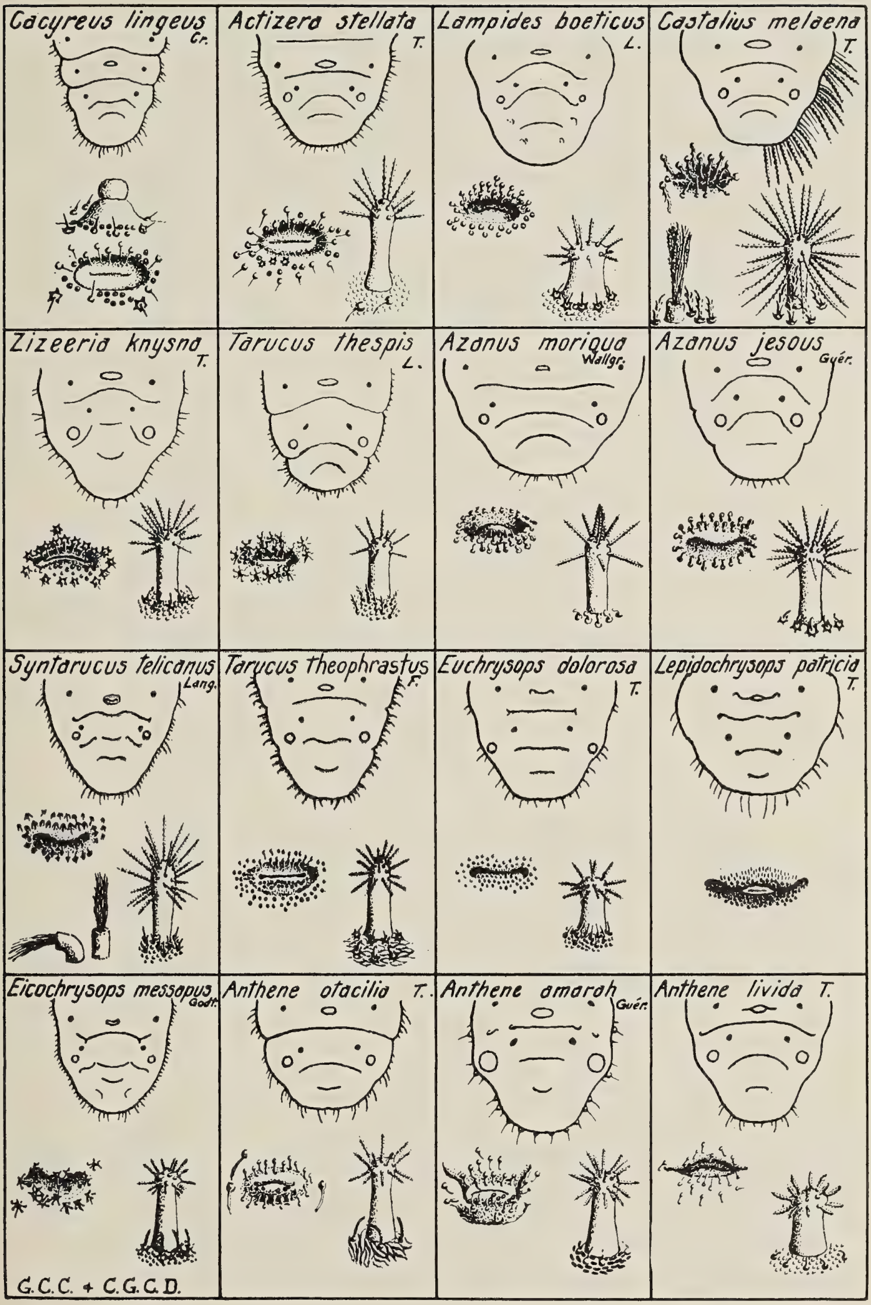
Referring to the illustrations, *Cacyreus lingeus* has no tubercle; the space is therefore utilized to show the honey gland bulged out and exuding a bead of liquid. The drawings of *Castalius melæna* include a view of the partially extended tubercle with spines bunched ready to be used as a brush, and the drawing of *Syntarucus telicanus* shows the method of brushing. The honey gland of *Epamera sidus* is difficult to detect as it resembles an ill-defined wrinkle between the 10th and 11th segements; consequently a side view of the larva is given with an enlarged view of the open gland. *Leptomyrina, Capys, Deudorix, Hypolycæna,* and *Lepidochrysops* have no tubercles, and only the honey gland is shown. In *Capys alphæus* two views are shown at right angles to each other, of the sunken gland, one showing the gland dormant, the other exuding a bead of liquid. The illustration of *Castalius hintza* shows the dormant tubercle and the spiracle.

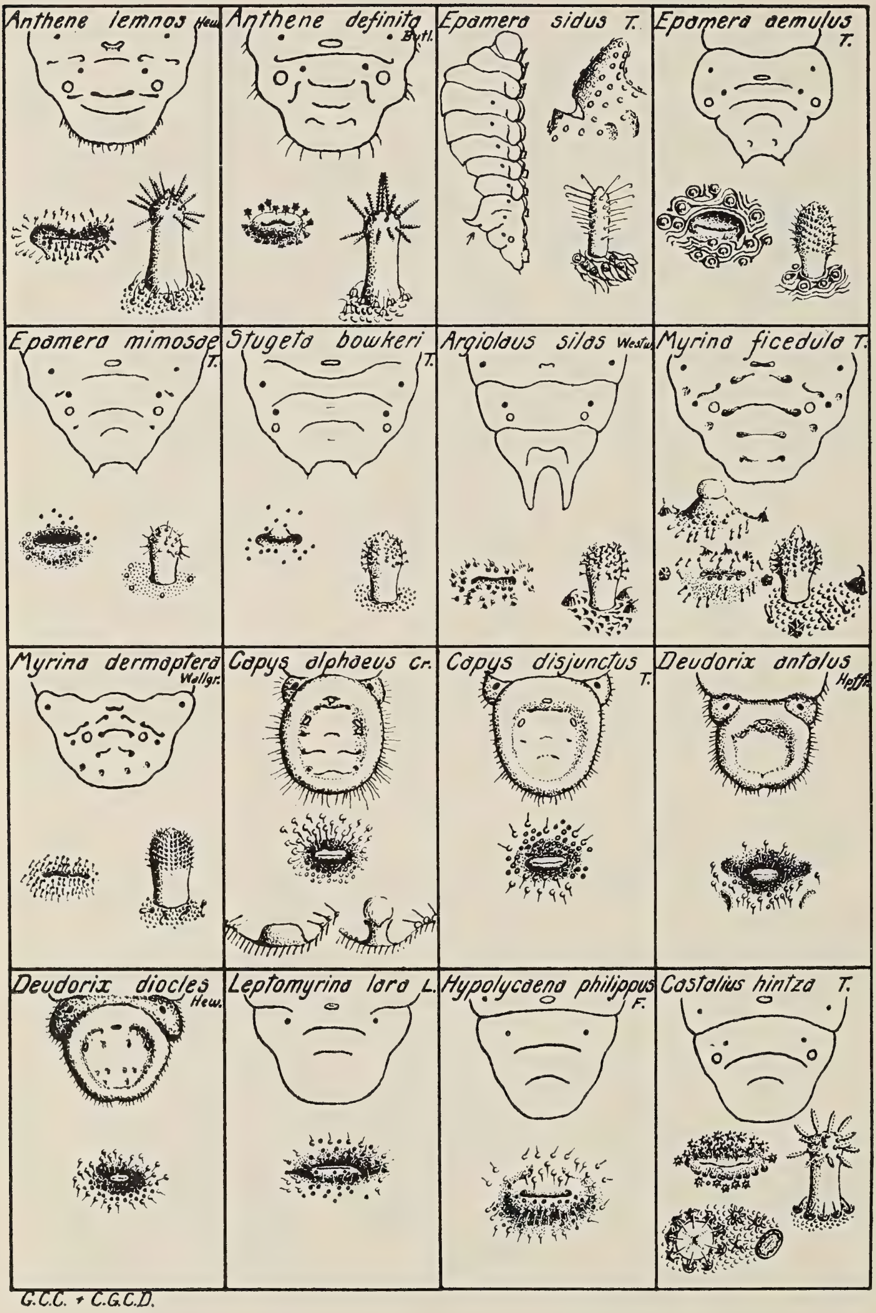
In the whip type the tubercles are present in the 1st instar, and drawings of the 1st instar tubercles are shown in all except *Phasis thero, Axiocerses bambana,* and *Pœcilmitis.* The small tubercle in the illustrations of *P. felthami* is that of the second instar.

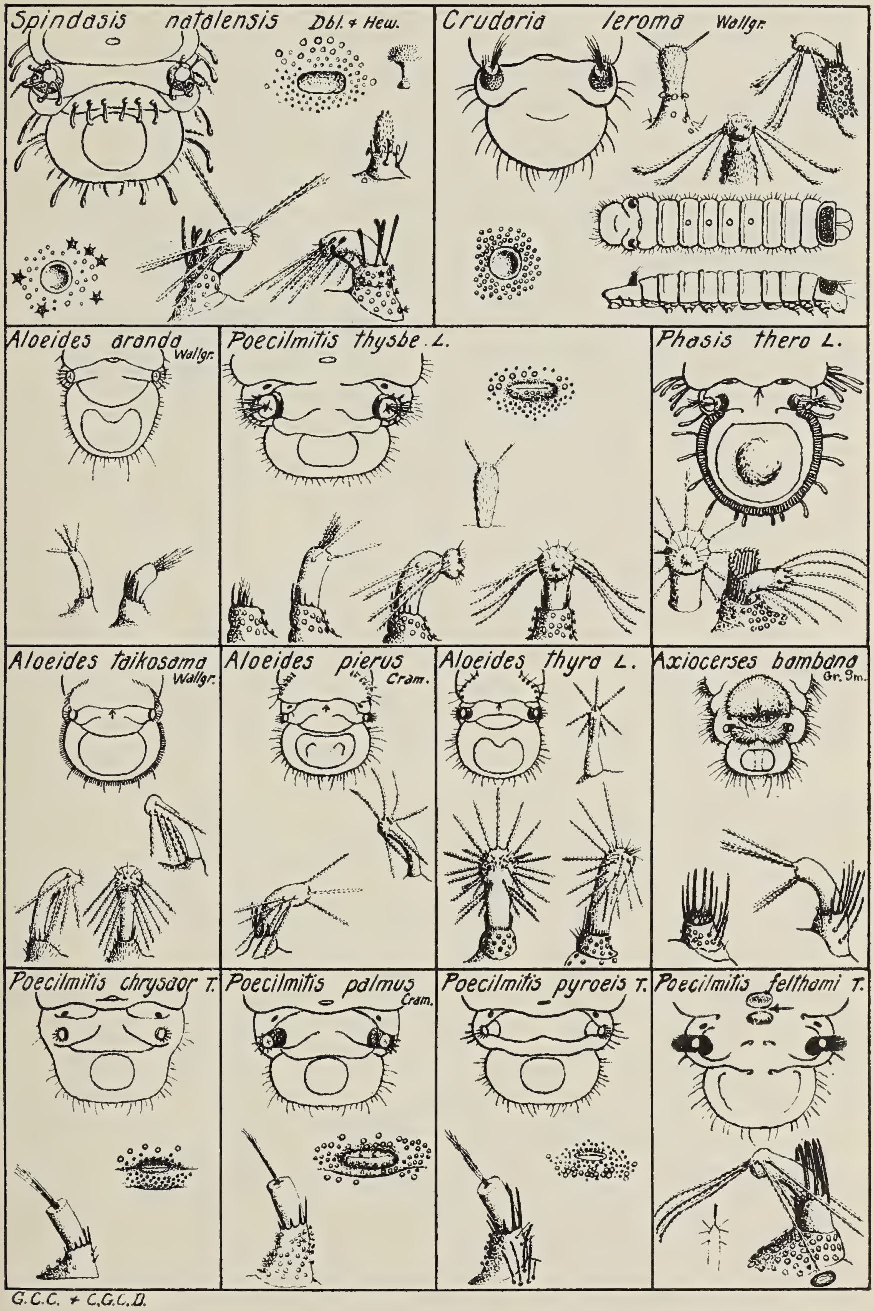
The protective rim spines of the cylinders of the tubercles are clearly shown, and in order not to foul these when extended, *Spindasis natalensis* has five spines on one side of the tubercle and only three on the other. In *Pœcilmitis thysbe* three illustrations are given to show the unfolding of the tubercle and one front view to show the spread of the bristles. The honey gland of the *Alœides* is tucked away under a fold of the junction of the 10th and 11th segments and is difficult to find until it functions. Its position in the drawings is marked by an arrow. The *Spindasis* and *Crudaria* have, in the centre of the segment, on the dorsum, a saucer-like dishing which suppurates a liquid similar to the honey gland, and ants are seen to take the liquid from these. These patches, called "dew patches" for want of a better name, first appear on the 5th segment in the 3rd instar of *C. leroma.* In the 4th instar the patch is prominent on the 5th segment, and there may be one on the 8th, though less developed, and there may be traces of patches on the 6th and 7th segments. In the final instar they are fully developed on segments 5 to 8, as shown in the illustration. In the *Spindasis* the first appearance of this patch is on the 5th segment of the penultimate instar, but in the final instar there is a fully developed patch on each of segments 5 to 8.

In captivity, the honey gland and "dew patches" of *C. leroma* suppurate freely, especially in the later instars, and unless ants are in attendance the liquid develops mildew which kills the larva. To prevent this, the liquid can be drawn off by a point of blotting paper. It may be as well to "wash" the glands with a very wet paint brush and thoroughly dry the larva with points of blotting paper.

Museum & Snake Park, Port Elizabeth, SOUTH AFRICA
and
Cambridge Ave., St. Michael's Est., Cape Town, SOUTH AFRICA


Cacyreus lingeus Cr.
Actizera stellata T.
Lampides boeticus L.
Castalius melaena T.
Zizeeria knysna T.
Tarucus thespis L.
Azanus moriqua Wallgr.
Azanus jesous Guér.
Syntarucus telicanus Lang.
Tarucus theophrastus F.
Euchrysops dolorosa T.
Lepidochrysops patricia T.
Eicochrysops messopus Godt.
Anthene otacilia T.
Anthene amarah Guér.
Anthene livida T.
G.C.C. + C.G.C.D.


Anthene lemnos Hew.
Anthene definita Butl.
Epamera sidus T.
Epamera aemulus T.
Epamera mimosae T.
Stugeta bowkeri T.
Argiolaus silas Westw.
Myrina ficedula T.
Myrina dermaptera Wallgr.
Capys alphaeus Cr.
Capys disjunctus T.
Deudorix antalus Hpffr.
Deudorix diocles Hew.
Leptomyrina lara L.
Hypolycaena philippus F.
Castalius hintza T.
G.C.C. + C.G.C.D.


Spindasis natalensis Dbl. + Hew.
Crudaria leroma Wallgr.
Aloeides aranda Wallgr.
Poecilmitis thysbe L.
Phasis thero L.
Aloeides taikosama Wallgr.
Aloeides pierus Cram.
Aloeides thyra L.
Axiocerses bambana Gr. Sm.
Poecilmitis chrysaor T.
Poecilmitis palmus Cram.
Poecilmitis pyroeis T.
Poecilmitis felthami T.

G.C.C. + C.G.C.D.

FIELD NOTES

MONARCHS NUMEROUS IN AN IOWA RAVINE

West of Cedar Falls, Iowa, along the Cedar River following the railroad tracks west about two miles is an excellent territory in which to collect butterflies. I have taken many fine specimens from this vicinity for several years. On Sept. 4, 1955, the weather was ideal for collecting, being clear with a high temperature of about 84° F., wind south-west but not strong. About one mile west there is a small wooded ravine sloping from the south to the north and about a quarter of a mile long. It was 2:45 P. M. when I decided to investigate this ravine. Upon entering at the junction of the tracks I counted 15 Monarchs (*Danaus plexippus* L.) flying about the opening of the high culvert under the tracks. While walking up the ravine I saw many Monarchs flying up and down the valley; all were in lazy flight, some would light on the trees or bushes, or even on the ground. One resting Monarch allowed me to walk up to it and pick it off the twig with my fingers. It was a male, and upon release he flew away in easy flight apparently not frightened by being caught. I easily captured 2 males and 2 females with my net for my collection, made no further attempt to catch any more. At another spot I counted 12 resting on a bush and about as many in the air. It was impossible to make an accurate count of numbers since there were so many flying all about me as I walked up and down the ravine. I probably saw at least 100 or more of these butterflies although not all at one time. I watched these Monarchs playing about until 4:00 o'clock, at which time I left the valley. The noticeable fact was their lazy easy flight and not being frightened by my presence.

There is another ravine similar to this one about a quarter of a mile to the east, so I thought it best to check this one also for Monarchs. I saw only four. This ravine was not quite as deep as the other and was noticeably dryer, and not so cool; possibly this would account for the fact that the Monarchs had a preference for that particular ravine. None of the Monarchs observed had any marks on their wings. Along the tracks away from the two ravines I saw seven Monarchs. Their manners of flying were definitely not lazy. Perhaps they were in a hurry to get to their "Valley of Enchantment".

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A SMALL MIGRATION IN VIRGINIA

September 25, 1955, on a party fishing boat off Colonial Beach, Viriginia, I observed over a period of about one-half hour (10 to 10:30 A. M.) eleven Monarchs (*Danaus plexippus* Linné), seven dark-colored butterflies of which two appeared to be Buckeyes (*Junonia cœnia* Hbn.) and one a Red-spotted Purple (*Limenitis astyanax* Fab.), and one Yellow Sulfur. All were flying a course approximately in line from Rock Point, Maryland, to Colonial Beach, across the Potomac River. All were quartering into the breeze which was blowing mildly but steadily from the northwest directly down the river.

On landing at Colonial Beach I attempted to follow the flight in the area from there to Wakefield by road. I observed only four Monarchs, three of which were feeding on flowers, but too shy to be captured for branding and one which was definitely migrating south at treetop level, slowing up occasionally to soar momentarily on rising air currents, as though "sniffing" the breeze.

There were three Buckeyes in one group resting on the grass, but they left at my approach and did not return. I captured one Red-spotted Purple which was resting on a leaf and appeared sluggish.

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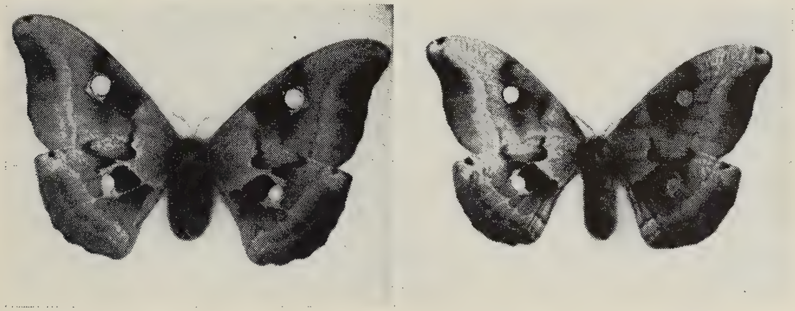
VARIATION IN THE POLYPHEMUS MOTH (SATURNIIDÆ)

One female *Antheræa* (=*Telea*) *polyphemus* (Hübner), which emerged from a cocoon on 5 May 1954, showed interesting deviations from the normal markings and coloration of the underside of its wings. The underside of this moth is shown in the accompanying figure, to the left (A); a normal specimen appears alongside it to the right (B).



Fore Wing: The most striking difference in A is the appearance of a white box surrounding the eye-spot on each of the fore wings. This box is bounded on two sides by the veins M_1 and M_3; the other two sides are tangent to the eye-spot itself. The box is perfectly symmetrical on both wings. The color of the box is a whitish brown with a dark brown outline which separates it from the rest of the wing. The brown diagonal band, that runs from the point where udc intersects Sc to the point where M_3 and Cu_1 intersect Cu_2, is black on specimen A. This band on A is bounded on the postbasal side by a rich reddish brown band, and on the other side by a large area of the same brown which extends from the main band to the box around the eye-spot. This appears in A as a darker area between the diagonal band and the box that surrounds the eye-spot. In the apical area of the wing of the normal moth B there are two black spots between R_2 and R_4. These spots are arranged one below the other separated by R_3 with the upper spot lying between veins R_2 and R_3 and the lower spot being just below R_3. In the aberrant female the only spot that appears is the upper one between veins R_2 and R_3. The lower spot is so much reduced as to be negligible. In the submarginal area of B there is a gray band that runs from R_4 through M_1, M_2, and terminates at M_3. In the aberrant moth this band starts at M_1 and terminates at M_3. The general allover coloring of A is darker and richer than B or any normal moth with which it was compared.

Hind Wing: In moth B there is a bridge which starts on the vein M_2 just tangent to the eye-spot and continues along udc until it reaches the point where udc meets R_5. Here it blends into the light area that extends from the base of the wing reaching from Sc to 3dA. Along the bottom of the eye-spot there is a second but almost invisible bridge from M_3. This bridge continues as a faint line that bypasses Cu_1 and Cu_2 and then blends into the light area. These two bridges as described above are of the normal moth. After a comparison of A to B it was found that in A the upper bridge was extremely wide and has an offshoot which continues along R_5. This is entirely absent in B. In moth B this bridge is no more than a faint line about one thirty-second of an inch in width; in A it is one-eighth of an inch. As mentioned above, the lower bridge in B is almost non-existant while in A it is clearly visible (see the figure). The overall coloring of moth B is a light brownish white with a deep brown between the two bridges, the deep brown extending from the upper bridge to the vein 2dA. In moth A these colors are darker and the dark brown is replaced by a reddish brown. In moth A there is a purple band running through 2dA to Sc which skirts the margin of the hind wing. Although there is a similar band in moth B, it is not purple but gray and therefore shows up in the photographs lighter than that of moth A.

One difference was noticed in the antennæ. In moth A they are blond; in B they are brown, as in all other moths in my collection.

Moth A was checked with all specimens in the collection of The American Museum of Natural History. We found after careful comparison that there were no specimens with similar variations in the markings and coloration of the wings.

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HEMILEUCA MAIA IN OHIO IN 1955 (SATURNIIDÆ)

A heavy flight of Buck Moths, *Hemileuca maia* Dru., took place in Ohio in 1955. On October 23, at Fort Hill State Memorial, Highland County, my brother, JOHN S. THOMAS, and I noticed exceptional numbers of the moths. My niece and nephews, VIRGINIA, JOHN N. and DAVID THOMAS, captured 15 specimens in about 30 minutes' time. All were in fresh condition. Incidentally, agile young people are much more effective in capturing these swift-flying insects than middle-aged naturalists!

On the same day, Mr. CONRAD ROTH, Portsmouth, reported that Shawnee State Forest in Scioto County was "full of them" and that many seemed to be just emerging. He sent two specimens to the Museum, both teneral.

Mr. ARTHUR R. HARPER, of Columbus, tells me that he saw "hundreds" of Buck Moths in Adams County at Blue Creek and at Lynx, over a period extending from some time prior to October 15 until November 11. Prof. J. N. KNULL, curator of insect collections, Ohio State University, observed many individuals in southern Hocking County on October 20.

In my experience, Buck Moths have been found flying on sunny days, mostly during the middle hours of the day. Mr. ROTH, however, states that on November 10, a dark, cloudy day, he found them "flying every where" early in the morning and on November 13 he saw "a good many" flying after sunset. The temperatures on November 10 were below normal, but November 13 was an exceptionally warm day: at Columbus the thermometer attained a maximum of 74 degrees Fahrenheit, equalling the all-time record for so late in the season.

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EUPHYDRAS PHAETON IN SOUTHERN INDIANA

A number of larvæ of the Baltimore (*Euphydryas phaeton* Drury) were found May 8, 1955, crawling on the ground and on small maples along a hillside in Brown County State Park, Indiana. On May 14, further search turned up more larvæ, some of which were apparently feeding on already badly chewed plants of *Chelone glabra.* The characteristic webs made by the caterpillars were also noted. The larvæ readily ate *Chelone* when presented to them in captivity, and some had pupated by May 19. BLATCHLEY (*17th Ann. Rept. Indiana Dept. Geol. and Nat.* Res., 1892) records *phaeton* as uncommon in Decatur, Vanderburgh, Vigo, and Monroe counties, and it probably occurs in local colonies throughout Indiana.

A dry, west-facing hillside seems far from the bog or marshy meadow habitat usually ascribed to this species. The humidity on the slope is doubtless influenced by an adjacent artificial lake, but the presence of the preferred foodplant is probably more important than the physical conditions. A study of the reported foodplants from the viewpoint of their biochemical affinities would be interesting.

FRANK N. YOUNG, Dept. of Zoology, Indiana University, Bloomington, Ind., U. S. A.

ESPECIALLY FOR FIELD COLLECTORS

(Under the supervision of JAMES R. MERRITT)

HAND-PAIRING OF BUTTERFLIES

by C. A. CLARKE and P. M. SHEPPARD

The ability to effect copulation in certain species of butterflies by the method of hand-pairing has been known for many years. In England early in this century a well known professional dealer used the method to mate *Papilio machaon* but it remained a secret "held so tightly that only rumours reached the ears of his friends" (T. W. JEFERSON, 1952, personal communication). In 1919 SWYNNERTON, working with *Papilio dardanus* in Africa, gave details of the method which he used to obtain artificial matings:- "Pairing now offers little difficulty. I have made it compulsory. The genitalia are brought into the correct juxtaposition, very slight pressure is exercised on the sides of the two abdomens with finger and thumb of each hand, and as soon as the male is seen (by abdominal movements) to take on, he is allowed to hang and both are placed in a box, better dark. Some males refuse".

FORD (1936) drew attention to the method when writing of the genetics of *Papilio dardanus* and thought that it was so important that it should be used in all future work on this butterfly. He pointed out that results based on a study of females fertilised in nature are always open to suspicion because of the possibility that broods may be of mixed paternity. SWYNNERTON'S method obviates this and moreover, if it is possible to mate the same male with two or more females of different forms (such as are found in *dardanus*) the genetic analysis is greatly simplified. Hand-pairing is also referred to by FORD (1945) in *Butterflies,* where he mentions that the wings of the female should be held either with a clip of the type used on retort stands or simply in a cleft cane.

LORKOVIC (1947, 1953, 1954) pointed out that natural pairing of butterflies is an instinctive act composed of several successive reflexes initiated by sight, odour, and touch and influenced also by external conditions such as temperature. It is also dependent on the integrity of the nervous system. In captivity butterflies are often unwilling to pair because the precise conditions necessary are not easy to obtain artificially; as a result matings in many species are effected only with the greatest difficulty or not at all. It is well known, however, that in some insects such as the mantis, copulation can be carried out successfully even when the abdomen is severed from the body. LORKOVIC, therefore, thought that in butterflies ablation of the head and thorax might enable pairing to take place more readily because inhibitory influences initiated by the cerebral ganglia might then be removed. On testing this hypothesis he found that separation of the abdomen from the head or, more simply, that squeezing the head and thorax of the male (so as to render the insect semi-paralysed) enabled matings to be obtained in many species of butterflies. The details of his method are as follows:- The female butterfly is placed on a table and the abdomen is pulled out from between the wings and a pin put in above it. The wings are folded above the body and are kept in place by a piece of glass. (See fig. 1.) The abdomen of a male butterfly, emerged preferably two or three days previously, and in whom the head and thorax have been crushed, is then taken in forceps and placed against the copulatory organs of the female. With a second pair of fine forceps the claspers of the male are opened and the two abdomens brought into apposition: at this moment the uncus engages, the claspers close round the body of the female, and thrusting movements by the male indicate that pairing has begun. When this occurs the female is removed from under the glass and placed on some object so that the male can hang from her abdomen. When pairing is finished the male breaks away from the female and falls down. The insect generally recovers and can then be used for subsequent matings.

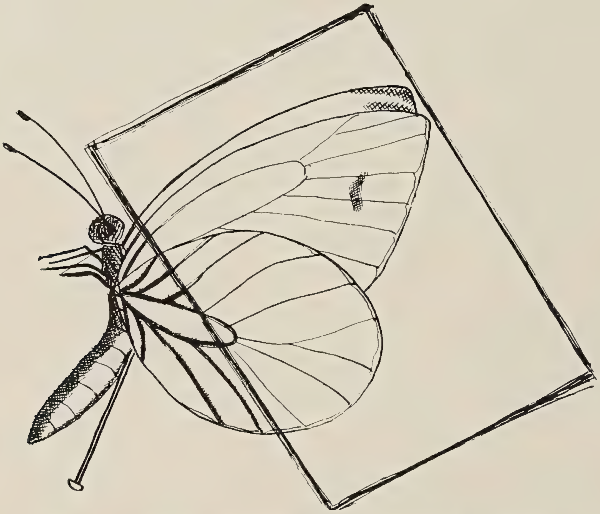

Fig. 1. Lorković method of positioning a female.

The method has been particularly useful in the Papilionidæ and Pieridæ, and LORKOVIC states that he has had no failures in any of the European members of these families which he has tested, except in the genus *Leptidea.* He has also succeeded in the Satyridæ with many species of *Erebia, Pararge,* and *Cœnonympha* and among Nymphalidæ with the genera *Limenitis, Neptis,* and *Melitæa.* Success is also claimed with some of the Hesperiidæ. In Lycænidæ the method is difficult to apply because in this family the genital armature is buried very deeply in the abdomen and it only emerges by reflexes provoked by the excitement of sight or scent.

The following list shows the various interspecific crosses which LORKOVIC has obtained, and he considers that method is here all-important because behavioural barriers would normally be a bar to copulation in these butterflies. It also enables successive broods to be obtained even when external factors are adverse — for instance it is invaluable for the continued breeding of *Colias croceus* through out the winter.

1. *Papilio p. podalirius* × *P. p. feisthamelii*
2. *Pieris rapæ* × *P. manni* (hybr. *lorkovici*)
3. *Pieris napi* ♂ × *P. ergane* ♀ (hybr. *naperga*)
4. *Pieris napi* ♂ × *P. manni* ♀ (hybr. *namanni*)
5. *Pieris napi* ♂ × *P. rapæ* ♀ (hybr. *narapæ*)
6. *Pieris rapæ* ♂ × *P. daplidice* ♀
7. *Pieris napi* ♂ × *P. daplidice* ♀
8. *Euchloe cardamines* ♂ × *E. euphenoides* ♀ (hybr. *cardaphenoides*)
9. *Euchloe cardamines* ♂ × *E. belia* ♀ (hybr. *cardabelia*)
10. *Erebia stirius* ♂ × *E. pronoe* ♀
11. *Erebia æthiops* ♂ × *E. styx* ♀
12. *Erebia tyndarus* ♂ × *E. ottomana* ♀
13. *Hesperia alveus* ♂ × *H. armoricanus* ♀

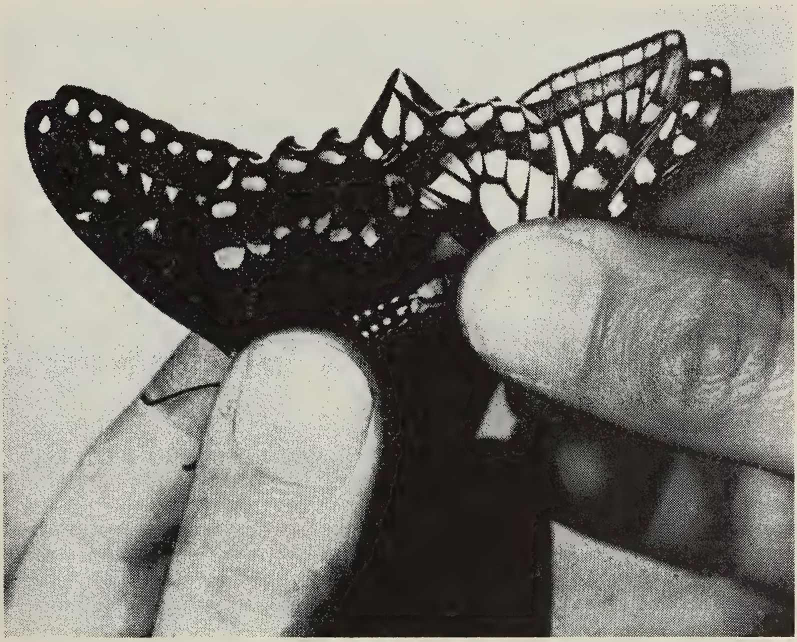

Fig. 2. Technique of hand-pairing; ♀ *P. asterius* and ♂ *P. machaon.*

CLARKE (1952), working independently with *Papilio machaon,* found that it was easy to hand-pair this butterfly and that much less attention to detail was necessary than with "natural" matings obtained under greenhouse conditions. The method he employed was essentially that of SWYNNERTON, the details being as follows:-First the butterflies are warmed in a cage for about ¼ hour at a temperature of between 65° and 80° F. They are then held as shown in figure 2, the male being easily distinguished by the triangular claspers on the last abdominal segment. Slight pressure causes the male to open his claspers widely and these then embrace the terminal segment of the female, correct positioning being facilitated by slight rotatory movements on the part of the operator. After some minutes "locking" occurs and moderate tension on the abdomens does not then cause separation. Simultaneously the head and thorax of the male appear to become lifeless. The butterflies normally remain together for half to three quarters of an hour, during which time thrusting movements by the male indicate that insemination is taking place. The photographs (fig. 3) show a pair of butterflies after hand-mating.

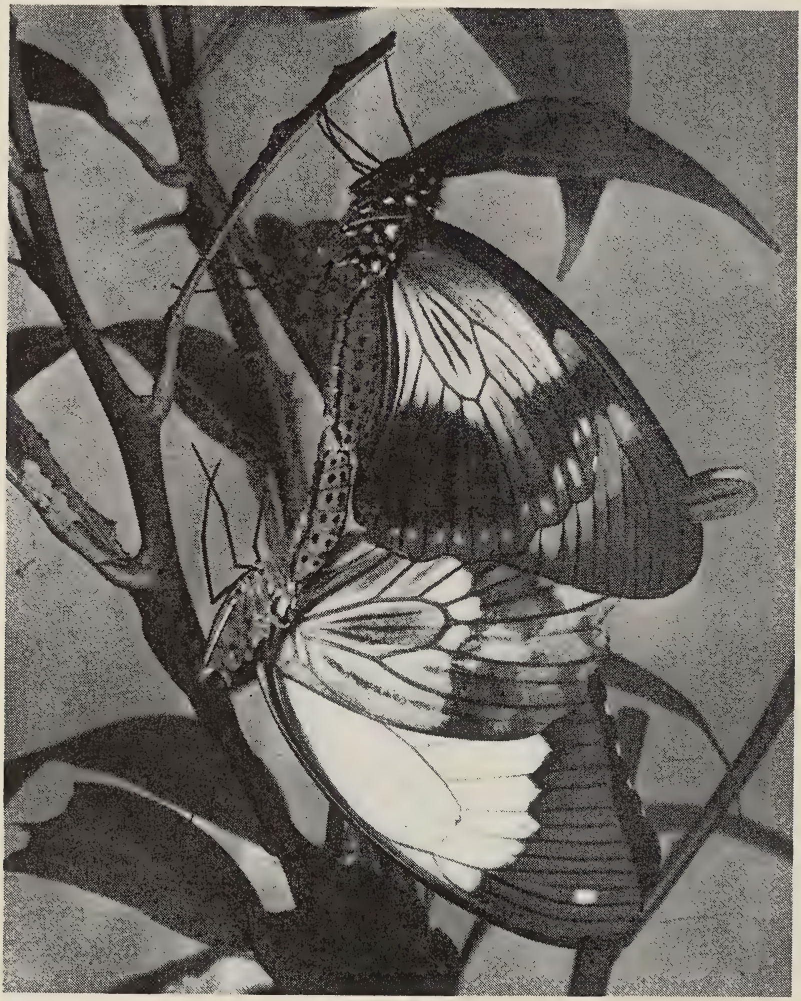

Fig. 3. *P. dardanus cenea*: ♀ form "leighi" pairing with ♂.

Over 1,000 matings have been carried out in this way during the past three years and the method has been successful with the following species and subspecies:- *P. machaon* (various races), *P. hospiton, P. machaon hippocrates, P. podalirius, P. demodocus, P. xuthus, P. asterius, P. bairdii, P. podalirius, P. zelicaon, P. indra, P. glaucus, P. rutulus, P. thoas, P. dardanus, P. polytes.*

It should be pointed out that LORKOVIC'S method of severing the abdomen has not been employed by us. Futhermore, on the occasions when our technique has failed, compression of the head and thorax has not brought about successful pairings and in our experience males maimed in this way do not survive so well for future matings, although they probably would do so in warningly coloured species which have tougher bodies.

Certain difficulties in our technique of hand-mating have been found in all the forms tested, and the following observations on this matter may be helpful.

(1) There is considerable variability with regard to the ease with which mating can be effected. Some males refuse all females, and many refuse some, though they may mate with a previously refused female after an interval of some hours, or even a day or two. The same remarks apply to females. If pairing does not occur within a very few minutes the butterflies should be left for a few hours.

(2) In the *machaon* group males of the races *britannicus, gorganus,* and *mediterraneus* appear to copulate much more readily than do those of *asterius, brevicauda,* and *zelicaon.* This is so marked that it is usually easier to obtain hybrids with these three butterflies using *machaon* males than it is to effect matings using males of their own species.

(3) Care must be taken to see that the butterflies are correctly approximated. Sometimes they appear to be so, but closer inspection with a hand lens may show the ædeagus to be improperly engaged. This is particularly so in *dardanus,* and in this species the bodies should be at an angle of less than the usual 180°. Matings lasting less than 10 minutes or more than 3 hours, particularly the former, may be unsatisfactory.

(4) Some of the insects of all the species tested have soft, flabby bodies and these, particularly the male, are most difficult to hand-pair. In *P. perrhebus* successful matings have never been obtained because of flabbiness and inability of the male to "take on".

(5) Some males appear willing but the ædeagus retracts when brought into contact with the female. Such insects are often unsatisfactory but successful pairing sometimes takes place after an interval.

LAYING

After a period of time, varying between one and seven days, the females may start laying, a temperature between 70° and 90° F. being optimum. The habits of the different species vary. (1) The *machaon* group oviposit best when allowed to flutter unconfined on the growing food plant (fennel or rue) in the greenhouse. A minority, however, will lay in cages to picked food plant. (2) *P. glaucus* and *P. rutulus* need to be walked repeatedly up a flat leaf of *Liriodendron.* (3) In *P. dardanus* it seems obligatory for the butterfly to be sleeved on the growing food plant. These insects flutter like moths before depositing and frequently lay best in the evening under a strong electric light.

In all the species tested there is very great variability in the number and fertility of the eggs laid; 70 eggs is a good total but some females produce more. Not infrequently even after apparently satisfactory pairings either no eggs or infertile ones are produced. Length of life in the butterflies is also variable, with females living from a few days up to three weeks. Life can be prolonged by keeping the insects cool when they are not in use, and by feeding daily in hot weather with sugar and water. This, in our opinion, is preferable to honey and water which may make the legs of the insects sticky and more liable to be torn off during the laying period.

APPLICATION OF HAND-PAIRING TO THE STUDY OF THE GENETICS OF THE PAPILIONIDÆ

In the *machaon* complex it was found that many of the North American, European, North African, and Japanese subspecies could be freely hybridised, and those that have been obtained are shown in the following list. Nearly always the F_1 of these pairings were infertile *inter se,* yet offspring could often be obtained by backcrossing the hybrids to either parent form. This has enabled some information to be obtained as to the method of inheritance of various characters. (Clarke & Knudsen, 1953, and Clarke & Sheppard, 1953, 1955a, 1955b, 1955c, and in press.)

1. *P. asterius* ♀ × *P. machaon* ♂ and reciprocal cross
2. *P. asterius* ♀ × *P. brevicauda* ♂ and reciprocal cross
3. *P. zelicaon* ♀ × *P. machaon* ♂ and reciprocal cross
4. *P. asterius* ♀ × *P. zelicaon* ♂ and reciprocal cross
5. *P. brevicauda* ♀ × *P. machaon* ♂
6. *P. brevicauda* ♀ × *P. zelicaon* ♂
7. *P. machaon* ♀ × *P. bairdii* ♂
8. *P. machaon* ♀ × *P. indra* ♂
9. *P. machaon* ♀ × *P. hospiton* ♂
10. *P. machaon hippocrates* ♀ × *P. machaon* ♂ and reciprocal cross
11. *P. asterius* ♀ × *P. machaon hippocrates* ♂

In *P. glaucus* information is accumulating as to the method of inheritance of the black and yellow female forms, the mating of the same male to the two different kinds of females having been effected on several occasions. *P. glaucus* has also been crossed with *P. rutulus* and a fertile backcross to *P. glaucus* has been obtained. (Clarke & Sheppard, 1955b.)

A start has also been made on breeding *P. dardanus cenea* in England. Again it has been found possible to mate the same male with more than one type of female. This has enabled some preliminary work to be done on the genetic difference between the the female forms "leighi" and "hippocoonides". The method is of particular importance when the characters concerned are sex-controlled to the female, as so often in mimicry.

It is clear that the application of the technique of hand-pairing to the Papilionidæ has shown that they provide some of the most suitable material ever investigated in animals for studying the process of speciation in detail. Moreover the method can be used with great advantage to study the genetics of the polymorphism and mimicry which occur so frequently in this family.

ACKNOWLEDGEMENTS

We are indebted to Dr. E. B. FORD, F. R. S., for the trouble he has taken in reading the manuscript, and for his helpful comments. One of us (P. M. SHEPPARD) is grateful to the Nuffield Foundation for its generous support.

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ARCTIC COLLECTING IN NEW ENGLAND

by DONALD J. LENNOX

When the southern edge of the last great ice sheet had been forced to recede northward and had reached the latitude of northern New England there appeared mountains of imposing height, the White Mountains of the present day. Because of their loftiness they extended up into layers of air so cold that secondary glaciers continued to linger on their higher shoulders for a long period, carving deep cirques in the mica schist composing this great wrinkle in the surface of the earth. It follows, then, that these peaks were also able to hold many of the forms of animal and plant life that had become acclimated to the glacier's edge.

Mount Washington has the reputation of being the stormiest summit in the east. Its wintry blasts commonly reach velocities of one hundred miles an hour and more, with temperatures tumbling to 30° and 40° below zero. Snow seldom lies where it falls but is speedily whisked into one or another of the many glacial cirques. However, during the brief summer, many Hudsonian forms of life have time to come forth and bloom, or fly, and carry out the activities of their species. There are numerous small terraces scattered over the mountain where plants and sedges indigenous to the arctic are to be found and it is from these spare beginnings that the native life springs.

Here, in mid-July, the lepidopterist will find the drab but exciting butterfly, *Œneis melissa semidea*, in its natural habitat, and the beautiful little noctuid, *Anarta melanopa.* The butterfly will rely for safety upon its coloration, which so nearly matches the lichen-encrusted rock surfaces and upon the ever-present wind which aids it swiftly beyond the outcroppings of rock and out of sight. The moth, relying more upon its remarkable likeness to the rough gray rock, will disappear at his feet.

If the collector returns again in mid-August he may expect to find the even more choice butterfly, *Boloria titania montina.* Confining itself closely to the many damp areas immediately about and below the ice-cold mountain springs, it is by far the rarer of the two butterflies peculiar to the mountain. The tree-line is reached on the White Mountains at between 4200 and 5000 feet, according to exposure. *B. montina* extends its territory down into the scrub wherever its favored wet terrain is found, and it may also be found well above the limit of trees where alpine springs flow from the mountain. It gathers sweets from the Alpine Goldenrod and the Blue Fall Aster. *Montina* is a rather easy butterfly to capture, and since it is quite restricted as to locale it should be collected conservatively. There is a definite chance of causing it to become scarce or even extinct from too much collecting in its accessible habitat.

Mount Washington presents extremes in jagged rock and delicate flower. The rock-strewn summit is like a massive rock garden during the brief summer, *Arenaria grœnlandica* nestles among the rocks in company with *Diapensia lapponica. Rhododendron lapponicum* hugs the boulders in company with alpine blueberries, and in especially favored spots, beneath the shoulders of great rocks, the extremely delicate little *Cassiope hypnoides* may be found.

Thus it is in such enchanting surroundings that the collector, fortunate enough to find himself able to reach them, may spend happy exciting hours of real arctic collecting in New England. But he who chooses a whole fair day is extremely lucky, for there is seldom one during the warm months when fluffy daytime clouds do not condense and obscure the sun at some time during the day.

Route #1, Whitefield, New Hampshire, U. S. A.

WHAT'S IN YOUR BACKYARD?

Those who have read SAMUEL H. SCUDDER'S *Butterflies of the Eastern United States and Canada* may remember many references to New Britain, Conn. Our little farm, just inside the city, is a wooded 5½ acre hilltop. The flora includes White, Yellow, and Black Birch, several oaks, Shagbark and Pignut Hickory, several maples, Hop Hornbeam and Ironwood, Beech, White Ash, Poplar, Spicebush, Alder, Hemlock, Red Cedar, pines, Tulip Tree, Basswood, Dogwood, Sumach, Sassafras, Willow, Chokecherry, Witch Hazel, *Kalmia, Vaccinium, Viburnum, Myrica,* flowering Raspberry, Blackberry, Elderberry, and other low shrubs.

Dr. REMINGTON'S interesting article on a one day record around New Haven on July 14th is really something to shoot at next year. Meantime, I wonder whether other "backyards" of similar extent to ours have as large a butterfly population. We have collected 47 species on our farm during the last year (1955), as follows:

Lethe portlandia
Euptychia cymela
Cercyonis alope
Danaus plexippus
Speyeria cybele
S. aphrodite
Phyciodes tharos
Polygonia interrogationis
P. comma
Nymphalis j-album
N. antiopa
Vanessa atalanta
V. virginiensis
Precis lavinia
Limenitis astyanax
L. arthemis proserpina
L. archippus
Asterocampa celtis
Strymon m-album
S. titus
S. melinus
S. falacer
Mitoura gryneus
Feniseca tarquinius
Lycæna phlæas
Everes comyntas
Lycænopsis argiolus
Papilio polyxenes
P. cresphontes
P. glaucus
P. troilus
Anthocaris genutia
Colias eurytheme
C. philodice
Eurema lisa
Pieris rapæ
P. virginiensis
Epargyreus clarus
Achalarus lyciades
Thorybes pylades
Pholisora catullus
Erynnis icelus
E. brizo
Ancyloxipha numitor
Polites themistocles
P. peckius
Poanes hobomok

Credit must be given to Oscar, one of our cats, for the single battered specimen we have of *P. cresphontes.*

Within a mile of our farm, we have collected 24 additional species:

Lethe eurydice
Euptoieta claudia
Boloria selene
B. toddi
Euphydryas phaeton
Melitæa harrisii
Strymon acadica
Incisalia niphon
Thorybes bathyllus
Erynnis horatius
E. juvenalis
Hesperia sassacus
H. metea
Polites verna
P. manataaqua
P. mystic
Wallengrenia otho
Poanes massasoit
P. zabulon
Atrytone logan
A. conspicua
A. ruricola
Atrytonopsis hianna
Lerodea l'herminieri

EDWARD J. & GEORGE T. AUSTIN, 99 May St., New Britain, Conn., U. S. A.

REVIEWS

ZUR MORPHOLOGIE DER SCHMETTERLINGSEIER [On the morphology of the eggs of Lepidoptera]. By Ewald Döring. 154 pp., 61 pls. (3 colored). 1955. Publisher: Akademie-Verlag, Mohrenstrasse 39, Berlin W 8, Germany. [Price, bound, 33 Marks.]

This book is one of the most noteworthy works ever written on classification of the immature stages of Lepidoptera. It stands alone as a manual for the identification of the eggs. Herr DÖRING has prepared a key to the eggs of 622 species and has given drawings of the dorsal and lateral views, micropyle, and lateral details of all of them. Some of the figures are rather badly blurred in reproduction, but all are usable. There are also 128 colored figures, showing the color changes during maturation of the egg in 30 species, and six plates showing diagrammatically the variations of micropyle type, surface sculpturing, profile, and natural groupings of eggs following oviposition. The nomenclature is the 1910 usage of SEITZ, but for convenience the *Register* at the end of the text also gives the comparable usage of BERGE & REBEL and of newer authors, especially BOURSIN and FORSTER.

In the body of the key, the plate and figure numbers are given for each species, and the figures also show the couplet number in which the species is to be found in the key. Throughout the key, in addition to the identification characters there is a brief description of the egg and its measurements.

Geographically, most of the species are from Germany, although a few other species popular with breeders are included. However, lepidopterists from all parts of the world can expect to find the book useful for comparison, and in many cases North Americans will be able to infer correctly the determination of their own species, which should often run in the key to a related German species.

Herr DÖRING sticks pretty close to the problem of identifying the eggs, but he devotes some space to evidence in the egg shape for phylogenetic classification.

The book deals with the so-called Macrolepidoptera and a few micros. The species are distributed as follows: 89 butterflies, 9 Zygænidæ, 22 Arctioidea, 11 Lymantriidæ, 14 Lasiocampidæ, 5 Drepanidæ, 5 Saturniidæ, 12 Sphingidæ, 20 Notodontidæ, 7 Thyatiridæ, 310 Noctuidæ, 112 Geometridæ, 1 Lemoniidæ, 1 Bombycidæ, 1 Endromididæ, 1 Ægeriidæ, and 2 Cossidæ.

C. L. REMINGTON

DIE SCHMETTERLINGE SÜDBAYERNS UND DER ANGRENZENDEN NORDLICHEN KALKALPEN. II. TEIL — DIE KLEINSCHMETTERLINGE. 2. HEFT — GLYPHIPTERYGIDAE BIS MICROPTERYGIDAE. By Ludwig Osthelder. Beilage zum 41. Jahrg., *Mitt. Münchn. Ent. Ges.* 135 pp. 1951. [Available from Münchner Entomologische Gesellschaft, Munich, Germany.]

The first *Heft* of this annotated checklist of the Microlepidoptera of southern Bavaria appeared with volume 29 of the *Mitteilungen.* Since the families are given in reversed phylogenetic sequence (*i.e.,* most primitive are last), this *Heft* completes the work. Localities, dates, and for some species other notes are given for each species, falling in families as follows: 14 species of Glyphipterygidæ, 48 Yponomeutidæ, 22 Plutellidæ, 276 Gelechiidæ, 245 Elachistidæ, 101 Gracilariidæ, 28 Lyonetiidæ, 80 Nepticulidæ, 5 Talæporiidæ, 90 Tineidæ, 5 Eriocraniidæ, 10 Micropterygidæ. Family lines are drawn more broadly than most contemporary authors would prefer. The type is unusually large and clear.

C. L. REMINGTON

INSECTS CLOSE UP. By Edward S. Ross. 81 pp. 1953. Publisher: University of California Press, Berkeley, Calif., U. S. A. [Price $1.50, paper bound.]

This little book is a gallery of the finest group of photographs of insects I have ever seen in print. The author is Curator of Entomology at the California Academy of Sciences and is a distinguished authority on classification of Embiids, some Coleoptera, and mosquitoes. Most recently he has concentrated on close-up photography of all groups of insects, and he presents a tantalizing sample of his work in this book. The text is written in an informal, conversational style, with comments on each group shown in the photographs. At the back of the book is a section on techniques of collecting, studying, and photographing insects.

C. L. Remington

CHECK LIST OF THE LEPIDOPTERA OF JAPAN. PART 2: ALUCITIDÆ — EPICOPEIDÆ. By Hiroshi Inoue. 105 pp. 15 October 1955. Publisher: Rikusuisha Co., 112/4 Iriarai, Otaku, Tokyo, Japan. [Obtainable from the publisher, unbound, for $2.00 postpaid.]

The first part of this List has been reviewed recently [*Lepid. News* 9: p.159]. Part 2 is in the same style and includes the following: 2 species of Alucitidæ, 414 Pyralididæ (written "Pyralidæ", but superfamily spelled "Pyralidoidea"), 10 Thyrididæ, 18 Zygænidæ, 2 Epipyropidæ, 17 Heterogeneidæ (= Eucleidæ, Limacodidæ). The pagination is continuous with that of Part 1. There are also 2 pages of "Additions and Corrections to Part 1." The author notes (*in litt.*) that only 500 copies of each part of this List are being printed.

C. L. Remington

TWO NEW JAPANESE PERIODICALS

SIEBOLDIA is apparently to be devoted to all areas of biology. Volume 1, no. 1, is dated September 1952; no. 2 is dated April 1953. It is published by the Biological Laboratory, General Education Dept., Kyushu University, Fukuoka, Japan; the subscription price is not shown in European characters on either number under review. In these two numbers are the first two parts of T. Shirôzu's "New or little known butterflies from Northeastern Asia, with some synonymic notes" (38 pp., 12 pls.) and a shorter, well-illustrated paper by Shirôzu & Yamamoto on morphology of the male genitalia of *Argyronome laodice japonica* Mén.

In November 1953, the first issue appeared of a new periodical devoted to papers on moths. This journal is called *TINEA.* The editor and publisher is Toshiro Sugi, 112/4, Iriari, Otaku, Tokyo, Japan. Each annual volume is to consist of two numbers. The subscription fee is $2.00 per volume, which seems rather expensive in view of the size (vol. 1 contained 58 pages) and the very poor quality of paper. Volume 1, no. 1 and no. 2 (July 1954), are devoted largely to four papers on Geometridæ by H. Inoue; these are in English. The editor is author of two on Noctuidæ. There are four other papers and reviews of literature. Most papers are in Japanese, but all but one have English summaries and figure captions. Several new genera and species are described. This periodical should be a significant and much-needed encouragement to potential moth students in Japan, where such excellent biological work has been done since the War by the very numerous group of butterfly enthusiasts.

C. L. Remington

RECENT LITERATURE ON LEPIDOPTERA

(Under the supervision of PETER F. BELLINGER)

Under this heading are included abstracts of papers and books of interest to lepidopterists. The world's literature is searched systematically, and it is intended that every work on Lepidoptera published after 1946 will be noticed here; omissions of papers more than 3 or 4 years old should be called to Dr. BELLINGER'S attention. New genera and higher categories are shown in CAPITALS, with types in parentheses; new species and subspecies are noted, with type localities if given in print. Larval foodplants are usually listed. Critical comments by abstractors may be made. Papers of only local interest and papers from *The Lepidopterists' News* are listed without abstract. Readers, particularly outside of North America, interested in assisting with this very large task, are invited to write Dr. BELLINGER (University College of the West Indies, Mona, St. Andrew, Jamaica, B.W.I.). Abstractors' initials are as follows: [P.B.] — P. F. BELLINGER; [I.C.] — I. F. B. COMMON; [W.C.] — W. C. COOK; [A.D.] — A. DIAKONOFF; [W.H.] — W. HACKMAN; [J.M.] — J. MOUCHA; [E.M.] — E. G. MUNROE; [N.O.] — N. S. OBRAZTSOV; [C.R.] — C. L. REMINGTON; [J.T.] — J. W. TILDEN; [P.V.] — P. E. L. VIETTE.

A. GENERAL

Komárek, Julius, & Jaroslav Tykač, *Atlas motylů,* 115 pp., 48 col. pls. Prague. 1953. [See note in *Lepid. News,* vol.9: p.158.]

Schwarz, Rudolf, *Motyli. 3.* 157 pp., 48 col. pls. Prague. 1953. [See note in *Lepid. News,* vol.9: p.158.]

Swanepoel, D. A., *Butterflies of South Africa: where, when and how they fly.* 320 pp., 17 pls. Cape Town: Maskew Miller Ltd. 1953. [See review in *Lepid. News,* vol.9: p.81.]

B. SYSTEMATICS AND NOMENCLATURE

Amsel, H. G., "Wissenschaftliche Ergebnisse der zoologischen Expedition des National Museums in Prag nach der Turkei. Microlepidoptera" [in German]. *Acta Ent. Mus. Nat. Pragæ,* vol.27: pp.411-429, 19 figs. 1952. Describes as new *Ethmia anatolica* (Suluhan); *Sarisophora occidentella* (Granada, Spain); *XANTHOCERA, X. luticostella.* Figures genitalia of new spp. and adult of *E. anatolica.* Lists 40 spp., 6 new to Turkey. [J. M.]

Angel, F. M., "Notes on the Lepidoptera of the Northern Territory of Australia, with description of a new species." *Trans. Roy. Soc. So. Australia,* vol.74: pp.6-14, 1 pl. 1951. Describes as new *Ogyris hewitsoni parsonsi* (Lycænidæ) (Aileron, N.T.); *Synemon wulwulam* (Castniidæ) (Pine Creek, N. T.); figures wings. [I. C.]

Bauer, David L., "Notes on the *Papilio machaon* complex in Arizona." *Lepid. News,* vol.9: pp.7-10. 8 April 1955.

Bernardi, Georges, "Note à propos de la *Leuconea cratægioides* H. Lucas (Lep. Pierididæ)" [in French, Czech summary]. *Folia Ent.,* vol.11: pp.28-29. 30 Sept. 1948. *L. cratægioides,* described from China, is a good species and not a synonym of *Aporia hippia.* [J. M.]

Bernardi, G., "Notes sur la taxonomie de deux *Colotis* malgaches" [in French]. *Naturaliste Malgache,* vol.6: pp.57-60, 6 figs. March 1955. *C. evanthe* is confined to Madagascar, Juan de Nova, & Comoro Is.; *C. evanthides,* confined to Madagascar, Aldabra Is., & Comoro Is., has no affinity with the continental African species; *C. evippe,* in the Madagascar area, is known only from the Comoro Is. [P. V.]

Biezanko, C. M., "*Colias lesbia pyrrhothea* Hübn., 1823 (Lepidoptera, Rhopalocera, Pieridæ), inimigo de alfalfa e de outras plantas aparentadas" [in Portuguese; English summary]. *Escola Agron. "Eliseu Maciel" Bol.* (Pelotas), no. 29: 23 pp., 2 pls. 1954. Describes generic characters and immature stages, female forms, economic aspects of *C. l. pyrrhothea;* figures venation and adults. [C. R.]

Bourgogne, J., "Un *Oreopsyche* nouveau de la chaine des Pyrénées" [in French]. *Rev. franç. Lépid.,* vol. 14: pp.199-203, 9 figs. Jan. 1955. Describes as new *O. lessei* (Psychidæ); describes last stage larvæ & case, distribution, & ethology. [P.V.]

Brown, F. Martin, Donald Eff, & Bernard Rottger, "Colorado butterflies. Part I. Satyridæ." *Proc. Denver Mus. Nat. Hist.,* no.3: 32 pp., 23 figs. 30 Sept. 1954. See review in *Lepid. News,* vol.9: p.21.

Burns, A. N., "Notes on Australian Rhopalocera with descriptions of new subspecies and life histories." *Mem. Nat. Mus. Victoria,* no.17: pp.83-105, 6 pls., 2 figs. 1951. Describes as new *Geitoneura klugi insula* (Rottnest Is., W. Australia) (Satyridæ) and *Ialmenus icilius parvus* (Geraldton, W. Australia) (Lycænidæ). Figures wings; gives life history notes and figures of wings and some genitalia of several other Rhopalocera. [I. C.]

Clench, Harry K., "Another case of a partially replaced lost vein in a new nyctemerid from West Africa." *Rev. Zool. Bot. Afric.,* vol.50: pp.296-301, 1 fig. 1954. Describes as new *NOCTASOTA, N. curiosa* (Cameroons). Replacement of lost vein previously reported for *Masurgina læta* (Agaristidæ). [P. V.]

Common, I. F. B., "The Australian species of *Heliothis* (Lepidoptera: Noctuidæ) and their pest status." *Australian Journ. Zool.,* vol.1: pp. 319-344, 1 pl., 4 figs. 1953. Four Australian species are recognized, three of which *(armigera, punctigera, rubrescens)* were previously confused under the name of *H. armigera.* The North American species is distinguished from *H. armigera.* Figures genitalia & wings of both sexes. [I. C.]

Common, I. F. B., "The Australian armyworms of the genus *Persectania* (Lepidoptera: Noctuidæ)." *Australian Journ. Zool.,* vol.2: pp.86-99, 1 pl., 4 figs. 1954. Describes as new *P. dyscrita* (Canberra, A. C. T.); retains 2 Australian & 1 New Zealand species. Figures genitalia and wings of both sexes. [I. C.]

Couchman, L. E., "Notes on a collection of Hesperiidæ made by F. M. Angel in the Northern Territory." *Trans. Roy. Soc. So. Australia,* vol.74: pp.15-17, 1 pl. 1951. Describes as new *Suniana larrakia* (Darwin, Australia) and figures the wings. [I. C.]

Descimon, H., & H. de Lesse, "Nouvelle note sur *Erebia serotina* escimon et Lesse" [in French]. *Rev. franç. Lépid.,* vol.14: pp. 237-241. March 1955. New captures of *E. serotina* in the Pyrenees, with study of the ♂ genitalia and the chromosome number. [P. V.]

Diakonoff, A., "Microlepidoptera of New Guinea. Results of the Third Archbold Expedition (American-Netherlands Indian Expedition 1938-1939). Part I." *Verhandel. K. Nederl. Akad. Wetensch., Natuurk., Sect. 2,* vol.49: pp.1-167, 1 pl., 208 figs., 1 map., Dec. 1952. Describes as new: (Alucitidæ) *Diacrotricha guttuligera: FLETCHERELLA,* and type *F. niphadothysana; Platyptilia monotrigona, P. phanerozona; Oidematophorus mesoleucus, O. irenæus; Stenoptilia galactostacta, S. iriana:* (Phaloniidæ) *ARACHNIOTES,* and type *A. dactylota; Clysiana scytalephora;* (Tortricidæ, Tortricinæ) *Zacorisca aptycha, Z. basilica, Z. aquamarina, Z. bovisanguis; CHIONOTHREMMA,* and type *C. placida, C. mesoxantha, C. ferratilis, C. sanguens, C. obscura, C. gracilis, C. ochricauda, C. nebulicola, C. auripes, C. cælestis, C. combusta, C. ocellata, C. citricaput, C. carbonifera, C. nigrangula, C. marginata, C. euxantha, C. mutans, C. pallescens, C. nivisperennis, C. auriflua, C. soligena; DIPHTHEROPYGA,* and type *D. niphadea: Isotenes megalea, I. melanotes, I. pudens, I. mesonephela, I. marmorata, I. prosantes, I. erasa, I. rhodosphen, I. sematophora, I. melanopa, I. melancalymma; ANISOTENES,* and type *A. leucophthalma, A. cacotechna, A. phanerogonia, A. schizolitha, A. dracontodonta, A. bathygrapha, A. libidinosa, A. stemmatostola, A. decora, A. pyrra, A. amphiloga, A. fallax, A. scoliographa, A. ellipegrapha, A. oxygrapta, A. spodotes, A. acrodasys; PARACHORISTA,* and type *P. cricophora, P. apheles, P. mimela, P. oligosta, P. pityrochroa, P. rhopalodes, P. colobodesma, P. anthracograpta, P. verecunda, P. acmemorpha, P. anassa, P. psara, P. lagaroptycha, P. stenoptera, P. ochra, P. euphyes, P. trulligera, P. anisographa, P. lutescens; HETEROCHORISTA,* and type *H. dispersa; Isochorista papuana, I. sulcata, I. polysperma: Trincophora archboldi, T. leucotorna, T. nebulosa: Adoxophyes controversa, A. acropeta, A. marmarygodes; Chresmarcha enæmargyrea.* Describes allotypes of *Adoxophyes vindicata* (♂), *A. nebrodes* (♀), *Chresmarcha sybillina* (♀). All from Snow Mts. Describes & figures genitalia; gives keys to New Guinea genera & species; discusses distribution of Tortricidæ & Zacoriscini (map). [See review in *Lepid. News,* vol.7: p.128.]. [A. D.]

Diakonoff, A., "New Guinea Microlepidoptera. I." *Proc. Kon. Nederl. Akad. Wetensch., ser.C,* vol.55: pp.382-393, 8 figs. 1952. Describes as new (Tortricidæ): *Zacorisca angi; PARADICHELIA,* and type *P. rostrata, P. brongersmai, P. euryptycha; MACROTHYMA* (type *Adoxophyes sanguinolenta* Diak.). Describes ♀ of *M. sanguinolenta.* All from New Guinea. Key to spp. of *Paradichelia.* Figures genitalia & venation. Notes on distribution of 4 other Tortricidæ. [N. O.]

Diakonoff, A., "New Guinea Microlepidoptera. II." *Proc. Kon. Nederl. Akad. Wetensch., ser.C,* vol.55: pp.394-406, 8 figs. 1952. Describes as new *Isotenes ornata, I. punctosa, I. clarisecta, Thrincophora deloptycha, T. microtera;* all from New Guinea. Describes the hitherto unknown ♀♀ of *I. crobylota, I. tetrops, Dicellitis cornucopiae.* Notes on distribution of 4 other spp. Genitalia figured. [N. O.]

Diakonoff, A., "Presidential address to the Pittsburgh Meeting of the Lepidopterists' Society." *Lepid. News,* vol.9: pp.41-45. 10 Aug. 1955.

Dixon, Bruce W., "A new subspecies of *Epargyreus clarus* from Arizona, with distributional notes." *Ent. News,* vol.66: pp.6-9. 1955. Describes as new *E. c. huachuca* (Huachuca Mts., Cochise, Co., Ariz.). [J.T.]

Eliot, J. N., "Notes on the *Nacaduba hermus* (C. Felder) complex (Lepidoptera: Lycænidæ)." *Proc. Roy. Ent. Soc. London (B),* vol.24: pp.153-158, 2 figs. 31 Oct. 1955. Describes as new *N. subperexia nadia* (Geelvink Bay, New Guinea); *N. s. paska* (Sula Besi, Sula Is.); *N. s. martha* (Geelvink Bay); *N. asaga solta (Siboga, Sumatra).* Key to *pavana* group of *Nacaduba* in the Indomalayan region. Notes on other subspecies of above spp. and of *N. sanaya.* [P.B.]

Evans, W. H., *A catalogue of the American Hesperiidæ including the classification and nomenclature adopted in the British Museum (Natural History). Part II (Groups B, C, D) Pyrginæ. Section 1.* v + 178 pp., 25 pls. *Part III (Groups E, F, G) Pyrginæ. Section 2.* v + 246 pp., 28 pls. London: British Museum (Natural History). 1952, 1953. Complete catalogue of American Pyrginæ, in key form; with numerous figures of ♂ genitalia, and localities of British Museum specimens. Describes as new (Part II): *Augiades* group: *Phocides distans silva* (Tarapote, Peru), *P. metrodorus metron* (Paraguay), *P. novalis* (Rio Colorado, Peru), *P. thermus bellina* (Macas, E. Ecuador), *P. partia* (Rio Colorado, Peru), *P. padrona* (Cajon, Cuzco, Peru); *Tarsoctenus corytus corba* (Pebas, Amazonas), *T. præcia luna* (Buenavista, E. Bolivia); *Phanus rilma* (Guerrero, Mex.); *Drephalys oriander oria* (Honduras), *D. opifex* (Berg-en-Daal, Dutch Guiana), *D. olvina* (Carimang R., Br. Guiana), *D. olva* (Isle Marajo, Pará); *Hyalothyrus infernalis infa* (Florida, Upper Putumayo, Amazonas), *H. neleus neda* (Farinas La Paz, Bolivia); *Entheus priassus pralina* (Espirito Santo, Brazil); *Cabirus procas junta* (Chanchamayo, Peru), *C. p. purda* (Pebas, Amazons). *Urbanus* group: *RIDENS* (type *Eudamus ridens*); *VENADA* (type *Telegonus advena*); *Epargyreus enispe elta* (Tanampaya, Bolivia), *E. spanna* (Santo Domingo), *E. socus cama* (Guerrero, Mex.), *E. c. chota* (Trinidad), *E. c. dicta* (Mapiri, Bolivia), *E. c. sinus* (Para), *E. exadeus cruza* (Cordova, Vera Cruz, Mex.), *E. nutra* (Cauca, Colombia), *E. aspina* (Bogotá, Colombia), *E. spina spina* (Bogotá, Colombia), *E. s. verruga* (Verrugas, E. Peru), *E. spinta* (Bogotá, Colombia), *E. spinosa* (Guerrero, Mex.); *Polygonus leo hagar* (Jamaica), *P. l. ishmael* (Haiti); *Chioides catillus albius* (Panama), *C. c. vintra* (St. Vincent), *C. iverna* (Chorica, Peru), *C. zilpa namba* (Magdalena, N. Sonora, Mex.); *Aguna asander jasper* (Jamaica), *A. megaeles malia* (Valencia, Venezuela), *A. claxon* (Atoyac, Vera Cruz, Mex.), *A. clina* (Bogotá, Colombia), *A. cirrus* (Alto de Sierra, São Paulo); *Typhedanus optica optica* (Br. Guiana), *T. o. goya* (Goyaz, Campinas); *Polythrix roma* (Pará), *P. gyges* (Rio Colorado, Peru); *Chrysoplectrum perna* (Bogotá, Colombia); *Codatractus carlos carlos* (Honduras), *C. c. rowena* (Putao Guiria, Venezuela), *C. c. arguta* (N. Mts., Trinidad), *C. alcæus apulia* (Ecuador); *Ridens philistus philia* (Cauca, Juntas, Colombia), *R. fulima* (Espirito Santo, Brazil), *R. nora* (Huacamayo, Carabaya); *Urbanus viterbeana alba* (Atoyac, Vera Cruz, Mex.), *U. pronta* (San Pedro Sula, Honduras), *U. pronus* (Ambato, Ecuador), *U. esma* (Obidos), *U. evona* (Zapote, Colombia), *U. elmina* (Rio Pastaza, Ecuador), *U. esta* (Alto de Sierra, São Paulo), *U. tanna* (Sta. Rita, Cauca R., Colombia), *U. cindra* (Buena Vista, E. Bolivia), *U. carmelita barra* (Bahia), *U. albimargo takuta* (Takutu R., Br. Guiana), *U. a. rica* (Villa Rica, Sapucay, Paraguay); *Astraptes apastus pusa* (Bahia), *A. narcosius aulina* (Fr. Guiana), *A. samson* (Colombia), *A. colossus rhoda* (Tarapote, Peru), *A. c. dosula* (Rio Grande do Sul), *A. parisi helen* (San Pedro Sula, Honduras), *A. alardus latia* (Costa Rica), *A. a. aquila* Cauca Valley, Colombia), *A. alfius alfius* (St. Paulo d'Olivenca, Amazon), *A. a. adoba* (Espirito Santo), *A. creteus crana* (San Geronimo, Guatemala), *A. c. crilla* (Zamora, Ecuador), *A. c. cyprus* (Bolivia), *A. latimargo tinda* (Pará), *A. chiriquensis erana* (Balzapamba, Ecuador), *A. galesus cassius* (Irazu, Costa Rica), *A. anaphus* (Tres Rios, Costa Rica), *A. a. anoma* (Trinidad), *A. a. aniza* (Callao, Peru); *Thorybes mexicana dobra* (Ft. Grant, Ariz.), *T. m. ducia* (Panama); *Cabares rinta* (Tucuman, Argentina). *Celænorrhinus* group: *SALATIS* (type *Papilio salatis*); *CEPHISE* (type *Goniurus cephise*); *Bungalotis borax borax* (Fr. Guiana), *B. b. lactos* (Chanchamayo, Peru), *B. quadratum barba* (Pará), *B. clusia* (Pará); *Sarmientoia dinka* (no locality); *Dyscophellus phraxanor lama* (Cayuga, Guatemala), *D. p. mena* (Ecuador), *D. marian* (Zamora, Ecuador), *D. ramusis ramon* (Bugaba, Panama); *Nascus solon corilla* (Venezuela), *N. prax* (Pará); *Porphyrogenes stupa* (no locality), *P. suva* (La Merced, Peru), *P. zohra stresa* (Tarapote, Peru), *P. boliva* (Venezuela), *P. spoda* (Chiriqui), *P. spanda* (Pará), *P. sparta* (Pará), *P. glavia* (Panama); *Ablapsis amazonensis renta* (San Gaban, Peru); *Orneates savia* (Rio Cachiyaca, Iquitos); *Celænorrhinus shema ochra* (St. Paulo d'Olivenca, Amazons), *C. s. vox* (Iquitos, Upper Amazons), *C. vagra* (Naula, Amazons), *C. similis stola* (Panima, Guatemala), *C. saroma saroma* (Colombia), *C. s. tonio* (Colombia), *C. s. timor* (Moyabamba, Peru), *C. cynapes darius* (Chimbo, Ecuador). Part III, *Telemiades* group: *MIMIA* (type *Cyclosemia phidyle*); *POLYCTOR* (type *Prygus* (sic!) *polyctor*); *MORVINA* (type *Tagiades morvus*); *MYRINIA* (type *Cyclosemia myris*); *OCELLA* (type *Cyclosemia albata*); *VIOLA* (type *Staphylus alicus*); *PLUMBAGO* (type *Achlyodes plumbago*); *TRINA* (type *Helias geometrina*); *ZERA* (type *Achlyodes zera*); *Œchydrus chersis rufus* (Novo Friborgo); *Marela tamyris tamba* (Iquitos, Upper Amazons); *Cogia hippalus hiska* (Corillo, Costa Rica), *C. h. hestor* (Merida, Venezuela), *C. azila* (Santiago de Chiquitos, Bolivia), *C. mala* (Guatemala); *Telemiades vansa* (Rio Demerara, Br. Guiana), *T. centralis contra* (Chimbo, Ecuador), *T. squanda* (Lake Sacuaresma, Rio de Janeiro), *T. trenda* (Surinam), *T. epicalus sila* (Venezuela), *T. antiope tosca* (Ega, Amazons); *Pyrdalus corbulo cora* (Honduras); *Mimia phidyle pazana* (Yungas La Paz, Bolivia); *Ectomis cythna ega* (Ega, Amazons); *Nerula tuba* (Itaituba, Amazons); *Eracon pebana* (Pebas, Amazons), *E. mnemon clada* (Maranham); *Spioniades abbreviata anta* (Bolivia); *Iliana heros heroica* (Rio Dagua, Colombia); *Sophista latifasciata matto* (Cuyaba, Matto Grosso); *Polyctor polyctor cleta* (Acapulco, Guerrero, Mex.), *P. p. dagua* (R. Dagua, Colombia), *P. fera falla* (Venezuela), *P. tensa* (Brazil); *Nisoniades bessus godma* (Chontal, Nicaragua), *N. b. panama* (Chiriqui, Panama), *N. b. benda* (Chimbo, Ecuador), *N. b. cauca* (Cauca, Distrito de Pereira, Colombia), *N. b. remo* (San Remo, Peru), *N. brazia* (Novo Friborgo, Brazil); *Pachyneuria jaguar* (Pozuza, Huanco, Peru), *P. lineatopunctata belema* (Pará, Belem), *P. duidae pozuza* (Pozuzo, Huanco, Peru), *P. licisca lista* (Fr. Guiana); *Pellicia costimacula arina* (Atoyac, Vera Cruz, Mex.), *P. tyana toza* (Magdalena Valley, Colombia), *P. angra angra* (Atoyac, Vera Cruz, Mex.), *P. a. axina* (Paramba, Ecuador), *P. theon tonga* (L. Sapatoza region, Colombia), *P. t. trax* (Ecuador), *P. ranta ranta* (Laguna de Sacuaresma, Rio de Janeiro), *P. r. rancida* (Paraguay); *Morvina morvus cyclopa* (Bolivia), *M. m. para* (Pará), *M. fissimacula lenia* (El Banco, Magdalena, Colombia), *M. f. rema* (Santarem, Amazons), *M. falisca falia* (Iquitos, Upper Amazons); *Myrinia santa santa* (Espirito Santo), *M. s. monka* (Pará); *Cyclosemia leppa* (R. Songo, Bolivia); *Gorgopas gutta* (Chanchamayo, Peru); *Viola olla* (San Gaban, Solimoes, S. Paulo de Olivenca, Upper Amazons), *V. egra* (L. Sapatoza, Chirigua, Colombia); *Bolla cybele* (Coatepec, Mex.), *B. cyclops sonda* (Orizaba, Mex.), *B. ziza* (Cuernavaca, Mex.), *B. antha* (Cauca Valley, Colombia), *B. brennus vexta* (Manizales, Colombia), *B. tetra oriza* (Orizaba, Mex.), *B. t. guerra* (Omilteme, Guerrero), *B. t. tornea* (Torne, Cauca, Colombia), *B. zora* (Ecuador); *Staphylus chlora* (Yungas, La Paz, Bolivia), *S. eryx* (Santarem, Amazons), *S. putumayo sambo* (Juhuty, Amazons), *S. epicaste stanga* (Paramba, Ecuador), *S. shola* (no locality), *S. perna* (Pernambuco), *S. mazans tierra* (Tierra Colorado, Guerrero, Mex.), *S. huigra canka* (Callao, Peru), *S. mossi* (Peru), *S. saxos saxos* (Cali, Colombia), *S. s. satrap* (San José, Bolivia), *S. minor manx* (Cauca, Colombia); *Diaeus lacaena verna* (Atoyac, Vera Cruz, Mex.), *D. l. ambata* (Ambato, Ecuador); *Gorgythion beggina vox* (S. Geronimo, Guatemala), *G. canda* (central Paraguay); *Ouleus matria dampa* (Fr. Guiana), *O. m. matria* (Iquitos, Upper Amazons), *O. fridericus salvina* (Atoyac, Vera Cruz, Mex.), *O. f. panna* (Panama), *O. f. trina* (Trinidad), *O. f. riona* (Novo Friborgo, Brazil), *O. dilla* (Chimbo, Ecuador), *O. accedens finda* (Espirito Santo, Brazil); *Zera phila hasta* (Costa Rica); *Quadrus fanda* (Pará), *Q. tros* (Espirito Santo, Brazil), *Q. deyrollei porta* (Teffe, Amazons); *Gindanes brontinus bronta* (Chanchamayo, Peru), *G. brebissoni brebna* (Cochabamba, Bolivia), *G. bora* (Espirito Santo); *Pythonides tullia* (Laguna de Sacuaresma, Rio de Janeiro, Brazil), *P. braga* (Roraima, Br. Guiana), *P. homer* (Chapada, Matto Grosso), *P. eminus pasha* (Chapada, Matto Grosso), *P. hampa* (Santarem, Amazons); *Sostrata grippa* (Rio Verde, Rio Pastaza, Ecuador), *S. jinna* (Coreato, Cauca, Colombia), *S. bifasciata nordica* (Mexico), *S. pusilla pulsa* (Zamora, Ecuador); *Paches loxus loxana* (Buenavista, Bolivia), *P. era* (Rio Pacaya, Lower Ucayali, Peru);*Milanion hemes pemba* (Cavallo-Cocho, Amazonas, Peru), *M. h. memba* (Nivac, Matto Grosso), *M. cramba* (Rio Colorado, Peru), *M. pilumnus pilta* (Moyabamba, Peru); *Paramimus stigma stanna* (Taboga Is.); *Charidia lucaria pilea* (Bogotá), *C. l. pocus* (Cuzco, Peru), *C. l. mayo* (Chanchamayo, Peru); *Potomanaxas flavofasciata pantra* (R. Songo to R. Suapi, Bolivia), *P. hirta paphos* (Paramba, Ecuador), *P. thestia cranda* (Costa Rica), *P. latrea tusca* (Ambato, Ecuador), *P. l. tyndarus* (Chanchamayo, Peru), *P. laoma trex* Ecuador), *P. l. trigga* (R. Tabaconas, N. Peru), *P. l. cosna* (Yungas, La Paz, Bolivia), *P. frenda* (Peru), *P. andræmon fuma* (Huancabamba, Peru), *P. a. forum* (Yungas, La Paz, Bolivia); *Mylon illineatus toxina* (Florida, Upper Putumayo, Amazons), *M. orsa* (Cache, Costa Rica), *M. mestor* (Ecuador), *M. salvia* (Bugaba, Panama), *M. ander ander* (Rio [de Janeiro]), *M. a. andrea* (Colombia), *M. cajus hera* (Panama); *Carrhenes fuscescens conia* (Fr. Guiana), *C. f. bamba* (Chanchamayo, Peru); *Clito littera anda* (Fr. Guiana), *C. sompa* (S. Antonio de Barra, Bahia, Brazil), *C. zenda* (Surinam), *C.*

tuva (Pará); *Onenses kelso* (Carimang R., Br. Guiana); *Antigonus liborius areta* (Rio Grande do Sul, Sta. Maria); *Timochreon satyrus forta* (Pará), *T. s. tampa* (Chapada, Matto Grosso); *Zopyrion evenor tressa* (Pará), *Z. e. thania* (Pernambuco), *Z. subvariegata thyas* (Chachapoyas, Amazonas, Peru); *Anisochoria pedaliodina bacchus* (Atoyac, Vera Cruz, Mex.), *A. minorella verda* (Rio Verde, Rio Pastaza, E. Ecuador), *A. bahia* (S. Antonio da Barra, Bahia), *A. vianna* (Goyaz, Viannopolis), *A. albida alco* (Tanampayo, Bolivia). *Erynnis* group: *TOSTA* (type *T. tosta* Evans); *GESTA* (type *Thanaos gesta*); *Achlyodes busirus rioja* (Rio de Janeiro); *A. thraso sagra* (Haiti), *A. minna* (Bahia), *A. selva* (Jalapa, Mex.); *Grais stigmaticus juncta* (Jamaica); *Timochares trifasciata sanda* (Tucumán, Argentina), *T. ruptifasciata runia* (Jamaica); *Anastrus petius peto* (Baños, Guatemala), *A. meliboea bactra* (Cochabamba, Bolivia), *A. obscurus narva* (Florida, Upper Putumayo, Bolivia), *A. o. chaqua* (Chaquimayo, S. Peru); *Tosta tosta* (Iquitos), *T. taurus* (Moyabamba, Peru); *Cycloglypha thrasibulus flinta* (Paramba, Ecuador), *C. polax* (Chapada, Matto Grosso); *Helias phalænoides cama* (Mexico); *Chiomara asychis simon* (Puebla Viejo, Colombia), *C. a. zania* (Chachapoyas, Amazonas, Peru), *C. a. vincenta* (St. Vincent), *C. a. grenada* (St. Georges, Grenada), *C. crenda* (Castro, Paraná); *Gesta inga* (Bahia). *Pyrgus* group: *Pyrgus centaureæ loki* (Long Peak Trail, Colorado); *Heliopetes randa* (Alto da Sierra, São Paulo), *H. chimbo* (Chimbo, Ecuador). A few corrections to Parts I and II are given at the end of Part III, including [*Pyrrhopyge thericles*] *grinda* (British Guiana), [*P. t.*] *ronda* (Trinidad), n. sspp. [P.B.]

Evans, W. H., *A catalogue of the American Hesperiidæ indicating the classification and nomenclature adopted in the British Museum (Natural History). Part IV (Groups H to P) Hesperiinæ and Megathyminæ.* v + 499 pp., 88 pls. London: British Museum (Natural History). 1955. Concluding volume of the catalogue. Keys to generic groups, genera, species and subspecies; figures of genitalia of many spp. Some named forms which have not been studied are listed at the end of the genera. Describes as new: *Carterocephalus* group: *PIRUNA* (type *Pholisora pirus*); *P. sticta* (Bolanos, Jalisco, Mex.), *P. cingo cingo* (Chilpancingo, Guerrero, Mex.), *P. c. sombra* (Guatemala); *Dardina rana* (Castro, Paraná), *D. castra* (Castro, Paraná), *D. jonesi* (Castro, Paraná); *Dalla thalia* (Ecuador), *D. grovius amba* (near Ambato, Ecuador), *D. g. floxa* (Chachapoyas, Amazons, Peru), *D. agathocles lanna* (Loja, Ecuador), *D. a. lonia* (Huancabamba, Peru), *D. lenda* (Loja, Ecuador), *D. lorda* (Loja, Ecuador), *D. costala ascha* (Huancabamba, Peru), *D. c. zona* (Chachapoyas, Amazonas, Peru), *D. c. costala* (Yungas del Espirito Santo, Cochabamba, Bolivia), *D. huanca* (Huancabamba, N. Peru), *D. sepia* (W. slopes of Andes, N. Peru), *D. hesperioides hister* (Limbani, S. Peru), *D. polycrates ambala* (Ambato, Ecuador), *D. p. lania* (Aqualani, SE Peru), *D. epiphaneus poya* (Chachapoyas, Amazonas, Peru), *D. e. anca* (Hunancabamba, Peru), *D. e. limba* (Limbani, Carabaya, Peru), *D. e. junga* (Bolivia), *D. frontinia frontinia* (Frontinia, Antioquia), *D. f. venda* (Venezuela), *D. f. vanca* (Huancabamba, Peru), *D. cyprius quinka* (Marcapata, Peru), *D. taza* (Baños, Rio Pastaza, E. Ecuador), *D. dimidiatus lilla* (La Oroya, Rio Inambari, SE Peru), *D. d. pucer* (Huayabamba, S. of Chachapoyas, Amazonas, Peru), *D. cocha* (Cochabamba, Bolivia), *D. miser* (Carabaya, Peru), *D. genes golia* (Huancabamba, NE Peru), *D. g. nona* (La Paz, Bolivia), *D. vinca* (Huancabamba, NE Peru), *D. spica livia* (Cochabamba, Bolivia), *D. cupavia elka* (Chachapoyas, Amazons, Peru), *D. merida* (Merida, Venezuela), *D. mentor* (Ecuador), *D. mora* (Loja, Ecuador), *D. carnis sondra* (Chachapoyas, Amazonas, Peru), *D. c. carnis* (Chaco, Bolivia), *D. pantha* (Huancabamba, N. Peru), *D. tona* (Huancabamba), *D. decca decca* (Baños, Rio Pastaza, E. Ecuador), *D. d. doppa* (Huancabamba, N. Peru), *D. eburones elna* (Buenaventura, Bogotá, Colombia), *D. e. ena* (Chachapoyas, Amazonas, Peru), *D. rosea* (Buenaventura, Bogotá, Colombia), *D. parma* (Ecuador), *D. mars* (Colombia), *D. quadristriga regia* (Chachapoyas, Amazonas, Peru), *D. q. rota* (Uruhasi, S. Peru), *D. q. rusa* (Chaco, Bolivia), *D. rubia* (Huancabamba, NE Peru), *D. xicca paza* (Yungas, La Paz, Bolivia), *D. curia* (Bogotá, Colombia), *D. curiosa* (Mexico). *Vinius* group: *LENTO* (type *Pamphila lento*); *LEVINA* (type *Apaustus levina*); *CORTICEA* (type *Hesperia corticea*); *CANTHA* (type *Cyclopides celeus*); *MISIUS* (type *Pamphila misius*); *RACTA* (type *R. racta*); *Falga jeconia jacta* (Rio Titaco, W. Colombia), *F. j. ombra* (El Topo, Rio Pastaza, Ecuador), *F. j. odol* (Uruhasi, S. Peru), *F. farina* (Yungas del Espirito Santo, Cochabamba, Bolivia); *Synapte malitiosa pecta* (Mexico), *S. m. puma* (Balboa, Panama), *S. m. equa* (Sara, Sta. Cruz de la Sierra, Bolivia), *S. salenus silna* (Guerrero, Mex.), *S. s. osta* (Sara, Sta. Cruz de la Sierra, Bolivia); *Lento hermione vina* (Inambari, Oroya, Peru), *L. longa* (Cavallo Cocho, Amazonas, Peru), *L. kadeni* (no locality), *L. lucto* (Cavallo Cocho, Amazonas, Peru), *L. listo* (no locality), *L. apta* (Chapada, Matto Grosso), *L. krexoides lora* (Takutu R., Br. Guiana); *L. k. ludo*

(Bolivar, Balzapamba, Ecuador), *L. k. genta* (Espirito Santo), *L. pyra* (Espirito Santo), *L. muska* (Cali, Colombia); *Corticea lysias potex* (Fr. Guiana), *C. l. pena* (Pena Branca, Brazil); *Zalomes biforis merida* (Merida, Venezuela), *Z. b. wanda* (W. Andes, N. Peru), *Z. b. illimanensis* (Illimani, Bolivia), *Z. kenava tassa* (interior of Colombia), *Z. k. vola* (Carabaya, Limbani, S. Peru); *Cantha celeus calva* (Ega, Upper Amazons), *C. ivea ivea* (Theresopolis), *C. i. honor* (São Paulo); *Vinius tryhana istria* (Iguassu, Paraná); *Pheræus honta* (Cavallo Cocho, Amazonas, Peru), *P. centra* (Iguassu, Paraná), *P. rumba* (Brazil); *Molo muzo* (Muzo, Colombia), *M. petra* (Bogotá), *M. stygia* (Iquitos), *M. menta ponda* (Cananche, Cundinamarca, Colombia), *M. m. menta* (Corcovada, Rio de Janeiro); *Racta apella raza* (Reyes, Bolivia), *R. phasma* (Balzapamba, Ecuador), *R. racta* (Uruhasi, S. Peru), *R. chiria* (Chirimayo, Peru), *R. dalla* (Zamora, Ecuador). *Apaustus* group: *VIRGA* (type *Apaustus virginius*); *LUDENS* (type *Cobalus ludens*); *PANCA* (type *Lerodea subpunctuli*); *SODALIA* (type *Pamphila sodalis*); *GALLIO* (type *Stomyles gallio*); *VENAS* (type *Pamphila evans*); *PAMBA* (type *P. pamba*); *SABINA* (type *Hesperia sabina*); *REPENS* (type *R. repens*); *LUCIDA* (type *Carystus lucia*); *VIDIUS* (type *Narga vidius*); *MONCA* (type *Cobalus telata*); *NASTRA* (type *Hesperia l'herminieri*); *SUCOVA* (type *Hesperia? sucova*); *MOLLA* (type *M. molla*); *ARITA* (type *Cobalus arita*); *CUMBRE* (type *Phanes cumbre*); *JUSTINIA* (type *Hesperia justinianus*); *LAMPONIA* (type *Hesperia lamponia*); *Apaustus gracilis smarti* (Kaiteur, Br. Guiana); *Callimormus radiola janna* (Sta. Rita, Cauca Valley, Colombia); *Eutocus matildæ vinda* (Cavallo Cocha, Amazonas, Peru); *Virga phola* (Matta Grosso); *Esprius veleda palta* (Pará, Amazons); *Methionopsis dolor* (Juntas, Cauca, Colombia); *Mnestheus damma* (Balzapamba, Ecuador); *Artines focus* (Roraima, Br. Guiana), *A. trogon* (Merida, Venezuela), *A. satyr* (São Paulo), *A. fosca* (St. Paulo d'Olivenca); *Mnaseas bicolor macia* (Rio Magdalena, Colombia); *Pamba pamba* (Bolivar, Balzapamba, Ecuador); *Repens repens* (Sta. Catharina), *R. repta* (Guadalajara, Mex.); *Lucida rogan* (Alto de Sierra, São Paulo); *Phanes espa* (Corcovado); *Vidius fido* Castro, Paraná), *V. nappa* (Castro, Paraná), *V. mictra* (Castro, Paraná), *V. tinta* (Goyaz), *V. nostra* (Santarem), *V. laska* (Chapada, Matto Grosso); *Monca telata penda* (Pena Branca, Brazil), *M. branca* (Pena Branca, Brazil); *Nastra tanta* (Chapada, Matto Grosso); *Cymænes idria* (Paraguay), *C. cavalla* (Cavallo Cocho, Amazonas, Peru), *C. laureolus loxa* (Pará), *C. chela* (Ciudad Bolivar, Venezuela), *C. odilia pacer* (Limbani, Carabaya, SE Peru), *C. gisca* (Sapucay, Paraguay), *C. jamba* (Cachi, Salta, Argentina); *Vehilius stictomenes madra* (Manabi, W. Ecuador), *V. gorta* (Goyaz); *Mnasitheus forma* (Pará), *M. nitra* (Castro, Paraná), *M. nella* (Castro, Paraná), *M. continua conta* (Rio Pastaza, Ecuador), *M. c. continua* (Bolivia), *M. spangla* (Rio Blanco, Ecuador); *Mœris rita* (Duenas, Guatemala), *M. duena* (Duenas, Guatemala), *M. padus* (Uruhasi, S. Peru), *M. striga stroma* (Atoyac, Vera Cruz, Mex.), *M. s. strada* (Trinidad), *M. ekka* (Ecuador); *Parphorus storax sorra* (Paramba, Ecuador), *P. felta* (La Merced, Peru), *P. oca* (Panama), *P. prosper* (Obidos), *P. granta* (Panama); *Molla molla* (Castro, Paraná); *Papias quigua* (Les Quigues, Esteban Valley, N. Venezuela); *Cobalopsis prospa* (São Paulo), *C. prado* (El Prado), *C. dagon* (Sapucay, Paraguay); *Arita serra* (Alto de Sierra, São Paulo); *Lerema ancillaris liris* (Atoyac, Vera Cruz, Mex.), *L. lenta* (Itanhaen, São Paulo); *Morys valerius valda* (Valladolid, Yucatan), *M. subgrisea prada* (Angostura, Venezuela), *M. sinta* (Obidos, Amazons), *M. yahua* (Yahuarmayo, Peru); *Cumbre belli eberti* (Minas Geraes, "Bergland um Ouro Preta, Fazenda Barcellos"); *Adlerodea lemba* (St. Paulo d'Olivenca, Amazon); *Psoralis venta* (Venezuela), *P. rusta* (Venezuela), *P. gota* (Colombia), *P. ravus* (São Paulo); *Tigasis altona* (Alto da Serra, São Paulo), *T. coda* (La Chima, Ecuador); *Vettius crispa* (St. Paulo d'Olivenca), *V. diana felix* (La Merced, Peru), *V. phyllus pura* (Cavallo Cocho, Amazonas), *V. p. yunga* (Yungas del Espirito Santo, Cochabamba, Bolivia), *V. p. prona* (Alto da Sierra, São Paulo), *V. diversa donga* (Huancabamba, N. Peru), *V. d. drona* (Yungas, La Paz, Bolivia), *V. drova* (Ambato, Ecuador), *V. fantasos onaca* (Polochic Valley, Guatemala), *V. yalta* (Espirito Santo, Brazil), *V. arva* (Rio [de Janeiro]), *V. coryna conka* (San Geronimo, Guatemala); *Turesis basta* (Santarem); *Thoon slopa* (Br. Guiana), *T. canta* (Cananche, Cundinamarca, Colombia), *T. ponka* (Pará), *T. yesta* (Oroya, Inambari, Peru), *T. rinka* (Rio Colorado, Peru); *Justinia phætusa norda* (Guatemala), *J. gava* (Carimang R., Br. Guiana), *J. justinianus cappa* (Paramba, Ecuador), *J. j. dappa* (Para), *J. septa* (Minas Geraes); *Eutychide sempa* (Br. Guiana), *E. angus* (Petropolis); *Naevolus nævus* (probably intended to be ssp. of *N. orius*) (Paramba, Ecuador). *Carystus* group: *VERTICA* (type *Hesperia verticalis*); *EBUSUS* (type *Papilio ebusus*); *ARGON* (type *Carystus argus*); *SACRATOR* (type *Hesperia sacrator*); *TROMBA* (type *T. tromba*); *TURMADA* (type *Dion turmada*); *MŒROS* (type *Proteides mœros*); *CARYSTINA* (type *Carystus lysiteles*); *TELLONA* (type

Hesperia variegata), *Styrioides quota* (Carimang R., Br. Guiana), *S. penna* (Teffe, Amazons), *S. quaka* (Bolivia); *Dion carmenta coma* (Bolivar, Balzapamba, Ecuador); *Enosis iccius* (Takutu R., Br. Guiana); *E. blenda* (Teffe); *E. blotta* (St. Anne, Trinidad), *E. immaculata demon* (Tarapote, Amazons); *Vertica ibis* (Bolivia), *V. pudor* (Joinville, S. Brazil); *Sacrator polites pilla* (Oxapampa, W. Peru); *Lychnuchus victa* (Uruhasi, S. Peru), *L. brasta* (Chanchamayo, Peru), *L. pelta* (Zamora, Ecuador); *Talides sinois cantra* (Guatemala), *T. s. riosa* (Antonio dos Brotos, San Fidelis, Rio de Janeiro), *T. alternata hispa* (Bugaba, Panma); *Tromba tromba* (Chanchamayo, Peru); *Carystus hocus* (Demerara), *C. periphas amax* (Cananche, Cundinamarca, Colombia), *C. junior* (Amazons); *Telles pyrex* (Florida, Upper Putumayo); *Tisias rinda* (Merida, Venezuela), *T. lesueuri canna* (La Oroya, Carabaya, Peru); *Cobalus virbius hanta* (Pernambuco); *Dubiella fiscella belpa* (Chiriqui); *Carystoides basoches yenna* (Cayenne), *C. balza* (Balzapamba, Ecuador), *C. lila* (L. Sapatoza region, Chirigua District, Colombia), *C. hondura* (Honduras), *C. lebbæus cundina* (Cananche, Cundinamarca, central Colombia), *C. manta* (W. Cordillera ,Colombia); *Lychnucoides ozias ozina* (Balzapamba, Bolivar, Ecuador); *Perichares philetes aurina* (Castro, Paraná), *P. p. limana* (Lima, Peru), *P. matha* (La Chima, Ecuador), *P. deceptus drina* (Dept. de Magdalena, Colombia), *P. chima* (La Chima, Ecuador). *Phlebodes* group: *SATURNUS* (type *Apaustus tiberius*); *JOANNA* (type *J. joanna*); *PUNTA* (type *P. punta*); *BRUNA* (type *B. bruna*); *QUINTA* (type *Cobalus cannæ*); *CYNEA* (type *Hesperia cynea*); *PENICULA* (type *Pamphila bryanti*); *DECINEA* (type *Hesperia decinea*); *ORTHOS* (type *Eutychide orthos*); *CONGA* (type *Pamphila chydæa*); *HOLGUINIA* (type *H. holguin*); *Saturnus saturnus servus* (Castro, Paraná); *Phlebodes campo sifax* (Amazons), *P. notex* (Tonantins, Amazons), *P. virgo* (Amazons), *P. torax* (Lagoon of Sacuaresma, Rio de Janeiro); *Joanna joanna* (Veragua, Panama), *P. boxi* (Berbice, Br. Guiana); *Punta punta* (Pará); *Bruna bruna* ("Masun" — ? Amazons); *Cynea cyrus hippo* (Trinidad), *C. c. rhino* (Cayenne), *C. fista* (Petropolis), *C. popla* (Trinidad), *C. robba robba* (Kaiteur Falls, Br. Guiana), *C. r. nippa* (Chapada, Matto Grosso), *C. hycsos somba* (Brazil); *Mucia visa* (Rio de Janeiro); *Penicula criska* (Boa Vista, Tapajos, Amazons), *P. cristina* (Cananche, Cundinamarca, Colombia), *C. crista* (Suapure, Venezuela); *Decinea decinea denta* (La Merced, Peru), *D. d. pruda* (Sapucay, Paraguay), *D. zapota* (Zapote, Guatemala); *Œonus egma* (Espirito Santo); *Cyclosma glamis* (La Merced, Peru); *Orthos orthos minka* (Manaos, Amazons), *O. trinka* (King Frederick William IV Falls, Upper Courantyne R., Br. Guiana); *Holguinia holguin* (Holguin, Cuba). *Hesperia* group: *STINGA* (type *Pamphila morrisoni*); *APPIA* (type *A. appia*); *LINKA* (type *Hesperia lina*); *POMPEIUS* (type *Hesperia pompeius*); *LIBRITA* (type *Hesperia librita*); *LIBRA* (type *Augiades? aligula*); *HANSA* (type *Hesperia hyboma*); *CHALCONE* (type *Augiades chalcone*); *PROPERTIUS* (type *Hesperia propertius*); *Ancyloxypha ramba* (Paramba, Ecuador); *Copæodes jean jean* (Kaiteur, Br. Guiana), *C. j. favor* (Castro, Paraná); *Hylephila phylæus taxus* (Baños, Rio Pastaza, Ecuador), *H. p. anca* (Limbani), *H. isonira mima* (L. Titicaca, Capachica), *H. zapala* (Zapala, Neuquen, Argentina), *H. galera* (Galera Pass, Junin, Peru); *Appia appia* (Soledad, Entre Rios, Argentina); *Polites vibex calla* (Callao, Peru), *P. baracoa loma* (Haiti); *Wallengrenia druryi sapuca* (Sapucay, Paraguay); *Pompeius darina* (Matto Grosso), *P. tinga* (Honduras); *Atalopedes campestris carteri* (Bahamas); *Ochlodes snowi pilza* (Pinal, Puebla); *Paratrytone melane poa* (Mt. Poas, Costa Rica), *P. barroni* (Zamora, Ecuador); *Mellana sista* (Venezuela), *M. pazina* (Yungas, La Paz, Bolivia), *M. noka* (no locality), *M. myron verba* (Balzapamba, Ecuador), *M. angra* (Pará), *M. villa* (Teffe, Amazons); *Librita raspa* (Zamora, Ecuador); *Euphyes vestris agra* (Bahamas), *E. ampa* (Honduras), *E. tuba* (Itaituba, R. Tapajos), *E. bryna* (Roraima, Br. Guiana), *E. antra* (Lima, Peru), *E. cherra* (Nericagua, R. Orinoco); *Hansa devergens hydra* (Castro, Paraná) *Chalcone chalcone corta* (Yungas, La Paz, Bolivia); *Serdis statius dives* (Huancabamba, NE Peru), *S. venezuelæ fulla* (near Ambato, Ecuador), *S. viridicans lupus* (Merida, Venezuela), *S. v. pandra* (Loja, Ecuador), *S. v. edith* (Chachapoyas, Amazonas, Peru), *S. v. junia* (W. slopes of Andes, N. Peru); *Metron chrysogastra gades* (Chanchamayo, Peru), *M. schrottkyi tomba* (Tombador, 16 mi. S. of Diamantino, Matto Grosso); *Phemiades pohli cidra* (Archidona, NE Ecuador), *P. vergens* (Cosnipata, E. Peru), *P. milvius milor* (Yahuarmayo, Peru). *Lerodea* group: *Amblyscirtes tolteca prenda* (Tucson, Ariz.); *Lerodea emba* (Chachapoyas, Amazonas, Peru). *Calpodes* group: *LINDRA* (type *Carystus simulius*); *SALIANA* (type *Papilio salius*); *AROMA* (type *Hesperia aroma*); *Panoquina panoquinoides calna* (Callao, Peru), *P. chapada* (Chapada, Matto Grosso), *P. trix* (Chapada, Matto Grosso), *P. fusina sonta* (Chiriqui), *P. f. viola* (Rio Grande, Brazil), *P. f. jumbo* (Jamaica), *P. luctuosa fonda* (Zamora, Ecuador), *P. l. cineas* (Huancabamba, N.

Peru); *Zenis jebus janka* (Bugaba, Panama); *Tirynthia conda* (Yungas, La Paz, Bolivia); *Thespieus pinda* (Limbani, Carabaya, SE Peru), *T. tiboneta pampa* (Oxapampa, Peru), *T. jora* (Castro, Paraná), *T. xarippe hallia* (Sta. Elena, Antioquia, Colombia), *T. othna tinka* (Atanques, Colombia), *T. thona* (Huancabamba, Peru), *T. paula* (Paranapanama, São Paulo, Brazil), *T. caraca* (Caraca, Minas Geraes, S. Brazil), *Vacerra bonfilius bonta* (Bolivia), *V. caniola elva* (La Merced, Peru); *Niconiades gladys* (Cananche, Cundinamarca, Colombia), *N. yoka* (Porto Velho, Matto Grosso), *N. linga* (Iguassu, Paraná), *N. loda* (Caraca, Minas Geraes, Brazil), *N. nabona* (Bolivia), *N. viridis vista* (Colombia), *N. parna* (Pará); *Aides epitus duma* (Santiago del Estero, E. Bolivia); *Xeniades chalestra corna* (São Paulo), *X. victoria* (Castro, Paraná); *Saliana salva* (Pará), *S. fusta* (Pará), *S. nigel* (Pará), *S. vixen* (Fr. Guiana), *S. esperi* (La Chima, Ecuador), *S. salona* (Pará), *S. morsa* (El Banco, Magdalena Valley, Colombia), *S. saladin saladin* (Paramba, Ecuador), *S. s. culta* (Pará), *S. s. catha* (Sta. Catharina); *Thracides cleanthes binota* (Venezuela), *T. c. quarta* (Rio Tono, C. Peru), *T. c. trebla* (Sara, Sta. Cruz, E. Bolivia), *T. c. quinta* (Bahia), *T. nanea nida* (Colombia); *Neoxeniades bræsia aqua* (R. Dagua, Colombia), *N. bajula peri* (Pará), *N. seron sexton* (Pará), *N. scipio posta* (Mayabamba, Peru), *N. s. nosa* (Bahia), *N. tropa* (Sta. Fe de Bogotá, Colombia), *N. myra* (Florida, Upper Putumayo), *N. irena* (Ambato, Ecuador); *Aroma henricus balba* (Bolivar, Balzapamba, Ecuador); *Pyrrhopygopsis agaricon nanta* (Paramba, Ecuador). In the addenda and corrigenda to the first three valumes are proposed: (Part II) *tenda* n.n. for [*Epargyreus clavicornis*] *orizaba* (the true *orizaba* is the proper name for [*E. socus*] *cama*); (Part III) *MICTRIS* (type *Pellicia crispus*) to replace *Mycteris,* a homonym. In another appendix are listed names incorrectly assigned to America, with their true localities and identity. Numerous changes are made in the names of North American skippers. [P.B.]

Fletcher, David S., "Lepidoptera Geometridæ." *Parc National de l'Upemba I. Mission G. F. de Witte (1946-49),* fasc. 32: pp.79-92, 1 pl., 10 figs. 1954. Describes as new *Scopula cinnamomata,* (Mubale R.) *S. nipha* (Lusinga). List of Geometridæ collected in the Upemba National Park, Belgian Congo. [P.V.]

Fletcher, D. S., & P. Viette, "Description de nouveaux genres et de nouvelles espèces de noctuelles quadrifides d'Afrique occidentale (Lep. Noctuidæ)" [in French]. *Bull. Inst. Franç. Afr. Noire,* vol.17: pp.168-184, 1 pl., 16 figs. Feb. 1955. Describes as new (from Mt. Nimba, Fr. Guinea, unless otherwise noted) (Noctuidæ): *Goniocalpe subviolacea; Marcipa nigropunctifera; Anoba subatriplaga* (Cameroons); *Oglasa plagiata* (Cameroons); *Bocula lamottei; Caryonopera royi; Trichopalpina nimba; Plecoptera nimba, P. mollardi; Zethesides simplex; EUNIMBATANA* (Ophiderinæ), & type *E. lobata; PSEUDUGIA* (Ophiderinæ), & type *P. bistriata; ZIELA* (Hypeninæ), & type *Z. biplaga; GAEDEODES* (Hypeninæ), & type *G. testacea; G. collenettei* (Ivory Coast). [P. V.]

Gregor, František, "The quercicolous *Lithocolletis* Hb. in CSR" [in Czech, Russian & English summaries]. *Folia Zool. Ent.,* vol.1: pp.24-56, 11 pls., 5 figs. 1952. Describes as new *L. quercifoliella cerris* (Kováčovské hills, S. Slovakia; larvæ in *Quercus cerris*). Important study of the genus. Gives remarks on bionomics, ecological & sociological analysis, phylogenetic conclusions, etc. All imagos are figured in color. Keys, in Czech. [J. M.]

Gregor, Fr., & D. Povolný, "What is *Lithocolletis staintoniella* Stt.?" [in English, Czech summary]. *Folia Ent.,* vol.12: pp.4-9, 1 pl., 8 figs. 1949. Describes all stages and ecology; figures larvæ, pupa, imago, & ♂ genitalia (larvæ & imago in color). [J. M.]

Gregor, F., & D. Povolný, "The members of *Lithocolletis* Hb. mining *Acer* and *Alnus*" [in Czech, English & Russian summaries]. *Folia Ent.,* vol.13: pp.129-151, 3 col. pls., 87 figs. 30 Dec. 1950. Important study of *Lithocolletis* mining *Acer* and *Alnus* in Central Europe. Data on bionomy and ecology are given; some spp. are figured in color. [J. M.]

Gregor, Frant., & Dal. Povolný, "Contribution à la faune lépidoptèrologique de la Tchécoslovaquie" [in Czech, French summary]. *Acta Soc. Ent. Čechosloveniæ,* vol.48: pp.74-80, 8 figs. 1 Sept. 1951. Records of 19 spp. Figures *Gelechia dzieduszykii, Tinea ankerella, Nothris lemniscella:* also genitalia of first & last, & of Czechoslovak spp. of *Anaitis* (Geom.). [J. M.]

Gregor, F., & D. Povolný, "Systematische und zoogeographische Studie über die Gruppe der Arten *Gnorimoschema* Busck mit Rücksicht auf die richtige Diagnostik des Schädlings *Gnorimoschema ocellatellum* Boyd" [in German, Czech introduction & Russian summary]. *Folia Zool. Ent.,* vol.3: pp. 83-96, 2 pls., 3 figs. March 1954. Describes as new *G. ocellatellum orientale* (Pohronsky Ruskov, S. Slovakia); G. *corsicanum* (Corsica); *G. ignotum* (E. France); subgenus *CARYOCOLUM* (type G. *leucomelanellum*). Revision of European spp. of genus. *Lita paniculatella* a synonym of *G. artemisiellum.*

Figures some adults in color, & genitalia of new spp. The taxonomy, phylogeny, and ecology of the group are discussed. [J. M.]

Herbulot, C., "Deux nouveaux *Neocleora* malgaches (Lep. Geometridæ)" [in French]. *Bull. Soc. Ent. France,* vol.60: pp.38-40, 2 figs. 1955. Describes as new, from Madagascar, *N. macracantha* and *N. legrasi.* [P. V.]

Herbulot, C., "Nouveaux Geometrinæ de Madagascar et des Comores (Lep. Geometridæ)" [in French]. *Ann. Soc. Ent. France,* vol.123: pp.115-126, 15 figs. Jan. 1955. Describes as new *Archichlora ioannis* (Anjouan, Comoro Archipelago), *A. alophias* (central Madagascar), *A. alophias catalai* (E. Madagascar); *Leptocolpia decaryi* (E. Madagascar); *Epigelasma corrupta* (central Madagascar), *E. rhodostigma* (E. Madagascar), *E. nobilis* (central Madagascar); *Heterorhachis harpifera, H. acuta, H. reducta, H. amplior, H. defossa, H. abdita, H. viettei; Omphax interfulgens* (all from central Madagascar); *Syncollesis pauliani* (S. Madagascar). [P. V.]

Higgins, L. G., "A descriptive catalogue of the genus *Mellicta* Billberg (Lepidoptera: Nymphalidæ) and its species, with supplementary notes on the genera *Melitæa* and *Euphydryas." Trans. Roy. Ent. Soc. London,* vol.106: pp.1-131, 2 pls., 88 figs., 4 maps. 15 April 1955. Redescribes genus, which includes the *athalia* group of *Melitæa.* Describes as new *M. aurelia distans* (Tekkes Valley, NW Tian-Shan); also 2 "modifications" (color forms below subspecific rank). Redescribes all species, subspecies, and modifications; catalogues all named "forms"; discusses geographical and other variation. Figures ♂ genitalia of all spp. Gives extensive suplementary notes to his catalogue of the *Melitæa* (1941). Summarizes classification of the Palearctic Melitæini (genera *Mellicta, Melitæa, Euphydryas*). [P. B.]

Hovanitz, William, "Amphi-atlantic study of *Colias hecla, Colias nastes* and *Colias palæno." Yearb. Amer. Philos. Soc.,* 1951: pp.142-144. 1952. Progress report on a study on a relationships between Palearctic and Nearctic populations of these spp. [P. B.]

Hrubý, Karel, "The distinguishing between the *Oporinia* species (Geometr.)" [in Czech, Russian & English summaries]. *Acta Soc. Ent. Cechosloveniæ,* vol.49: pp.135-145, 4 figs. 15 Nov. 1952. Gives important characteristics of all the Central European species (*O. dilutata, O. autumnalis,* & *O. chrystyi*). [J. M.]

Kiriakoff, Serge G., "Lepidoptera Heterocera" [in French]. *Explor. Parc National de l'Upemba, Mission G. F. de Witte,* fasc.26: 69 pp., 7 pls. Sept. 1954. List of the 253 species of Macroheterocera (excluding Geometridæ) collected by de Witte and collaborators (1946-49) in the National Park of Upemba (Belgian Congo). Describes as new: (Sphingidæ) *Prædora marshalli meridionalis;* (Limacodidæ) *Birthama saturata; Phorma limbata, P. subericolor;* (Noctodontidæ) *Pygæa leloupi; Notoxantha witteana; Polienus ochraceus orientalis, P. lusingæ; Pydna indecora;* (Thyretidæ) *Metarctia* (*Œnarctia*) *upembæ;* (Arctiidæ) *Aglossosia pallidula; Caripodia jansseni; Pseudelpista unicolor; Œdaleosia sordidula; Eilema danieli; Ctenosia fageli, C. roscidella, C. rotundula; Phryganopsis brunneitincta; Amata tomasina reducticincta;* (Agaristidæ) *Pais straeleniana;* (Noctuidæ) *Timæa janmoullei; Matopo tamsi; Ethiopica subpurpurea; Isadelphina mariæclaræ.* The loaation of the types is not given; no doubt in the Brussels Museum. [P. V.]

de Lesse, H., "État actuel de la systématique du groupe *d'Erebia tyndarus* Esp. (s.l.). Note complémentaire" [in French]. *Rev. franç. Lepid.,* vol.14: pp.258-259. March 1955. *E. nivalis* (chromosome number n=11) and *E. callis* (n=15) are probably good species; *E. calcarius* is also no doubt a good species; the problem of *E. tyndarus* & *E. cassioides* (both n=10) remains. [P. V.]

Lorković, Z., & H. de Lesse, "Nouvelles découvertes concernant le degré de parenté d'*Erebia tyndarus* Esp. et *E. cassioides* Hohenw." [in French]. *Lambillionea,* vol.54: pp.58-67, 78-86, 2 figs. 25 Dec. 1954. New notes on the relationship between *E. tyndarus* and *E. cassioides.* The subspecies ("race" in the French text) *aquitania* belongs to *cassioides,* as well as the subspp. *macedonica, illyrica,* and *illyromacedonica.* The distribution of *E. tyndarus* is not as extensive as was thought, being limited to the central Alps. The authors distinguish a new semispecies *nivalis,* the altitudinal population of Pasterzen. As concluded from previous studies, in place of two species *E. tyndarus* and *E. cassioides,* we have today the two species *E. hispania* and *E. tyndarus,* this last with two semispecies *E.* (*t.*) *cassioides* and *E.* (*t.*) *nivalis.* The end of the paper is a long study of the contact areas between *E.* (*t.*) *tyndarus, E.* (*t.*) *cassioides,* and *E.* (*t.*) *nivalis.* [P.V.]

McDunnough, James H., "New Microlepidoptera from the region of Halifax, Nova Scotia, with notes on other species." *Amer. Mus. Novit.,* no.1686: 15 pp., 9 figs. 11 Aug. 1954. Describes as new *Anchylopera rhodorana* (Point Pleasant Park, Halifax; on *Rhodora*); *Coleophora peregrinævorella* (Halifax; on *Comptonia peregrina*); *C.*

multicristatella (Point Pleasant Park; on *Gaylussacia* and *Rhodora*); *C. bispinatella* (Wellington, N. S.; on *Juncus canadensis*); *Gracillaria rhodorella* (Halifax; on *Rhodora*). Figures genitalia and some larval cases of new *Coleophora* spp. Redescribes *C. paludicola* (larva on sweetfern and bayberry); *Gracillaria flavella* (larva on bayberry). *Coleophora zelleriella* Chambers, unrecognizable, a homonym of *zelleriella* Heinemann. New foodplant records: *Aphania bifida* (*Alnus crispa*); *Exartema melanomesum* (*Kalmia*); *Pseudexentera costomaculana* (*Hamamelis virginiana*). [P.B.]

McDunnough, James H., "The species of the genus *Hydriomena* occurring in America north of Mexico (Geometridæ, Larentiinæ)." *Bull. Amer. Mus. Nat. Hist.*, vol.104: pp.237-358, 3 pls., 185 figs. 6 July 1954. Describes as new *H. exculpata josepha* (Chief Joseph Mts., Oregon); *H. e. nanata* (Hopedale, Labr.); *H. expurgata nicolensis* (Nicola, B. C.); *H. e. alticola* (Estes Park, Colo.); *H. irata lobata* (Mt. Lolo, Kamloops, B. C.); *H. charlestonia* (Sawmill Spr., Charleston Mts., Nev.); *H. edenata prasinata* (Inverness, Marin Co., Calif.); *H. e. baueri* (Anderson Spr., Lake Co., Calif.); *H. johnstoni* (Inverness, Marin Co., Calif.); *H. divisaria brunnescens* (McLean Bogs Reserve, Tomkins Co., N. Y.); *H. renunciata viridescens* (Inverness, Marin Co., Calif.); *H. pluviata meridianata* (Crailhope, Green Co., Ky.); *H. rita* (Madera Canyon, Sta. Rita Mts., Ariz.); *H. furcata fergusoni* (Peggy's Cove, Halifax Co., N. S.); *H. cyriadoides* (Tucson, Ariz.); *HYMENODRIA* (type *Hydriomena mediodentata*). Figures adults of new entities and some others, and genitalia of almost all spp. Key to 9 species groups. Also names one "form". See review in *Lepid. News*, vol.8: p.171. [P.B.]

McDunnough, James H., "Critical remarks on the synonymy of certain *Anchylopera* species, with description of new species (Lepidoptera, Eucosmidae)." *Amer. Mus. Novit.*, no.1725: 16 pp., 1 fig. 11 May. 1955. Dscribes as new *A. columbiana columbiana* (Penticton, B.C.); *A. c. shastensis* (Shasta Retreat, Siskiyou Co., Calif); *A. simuloides simuloides* (Deep Creek, Peachland, B.C.); *A. s. sierræ* (Mineral King, Tulare Co., Calif.); *A. s. litoris* (Carmel, Calif.). Sinks *Phoxoperis angulifasciana* to *A. metamelana;* also discusses *A. discigerana, A. laciniana,* and *A. spiræafoliana.* Describes genitalia of genus. [P.B.]

McDunnough, James H., "New species of Coleophoridæ, with notes on other species (Lepidoptera)." *Amer. Mus. Novit.*, no.1719: 7 pp., 2 figs. 22 April 1955. Describes as new *C. canadensisella* (Halifax, N. S.; on *Cornus canadensis); C. vacciniivorella* (Halifax; on *Vaccinium).* Compares *C. salicivorella* with *C. viminilella.* Records *C. cæspititiella,* new to North America. Sinks *C. thalasella* to *C. versurella.* [P.B.]

Marion, H., "Deux pyrales paléarctiques nouvelles: *Mecyna joannisalis* n.sp. et *M. syriacalis* n.sp. (Lep. Pyraustidæ)" [in French]. *Entomologiste,* vol.11: pp.20-23, 6 figs. April 1955. Describes as new *M. joannisalis* (Algeria) and *M. syriacalis* (Glazir, Syria). [P. V.]

Marion, H., "Synonymie de quelques pyrales décrites de Madagascar" [in French]. *Naturaliste Malgache,* vol.6: pp.75-78. March 1955. New synonymy: *Botys poeyalis* (=*Marasmia venilialis*); *B. docalis* (=*Filodes grisealis*); *Hyalobathra filalis* and *H. aurata* are not synonyms; *Sameodes cancellalis* and *S. vespertinalis* are different species. [P. V.]

Miller, Fr., & Dal. Povonlý, "*Homeosoma nebulellum* Hbn. — nový škůdce slunečnice u nás" [in Czech, Russian and English summaries]. *Folia Ent.*, vol.14: pp.49-59, 56 figs. 31 July 1951. Bionomy, systematics, and control of *H. nebulellum* — a pest of sunflower in South Moravia — are given. [J. M.]

Moucha, J., "Contribution à la connaissance de *Papilio machaon* L. de Palestine — Lep. Papilionidæ" [in French]. *Bull. Soc. Ent. Mulhouse 1954:* pp.69-75, 8 figs. Dec. 1954. Refers Palestine specimens to *P. m. syriacus; P. m. palæstinensis* Eller is a *nomen nudum.* Detailed description of two local populations. [P. B.]

Moucha, Josef, & Dalibor Povolný, "The Czechoslovak species of the genus *Ophiusa* Ochs. (Phalænidæ)" [in English; Czech introduction and Russian summary]. *Acta Ent. Mus. Nat. Pragæ,* vol.29: pp.25-40, 4 pls. 20 June 1955. Distribution, morphology and phylogeny of the 5 Czechoslovak spp. are given; imagos and ♂ & ♀ genitalia of all are figured. [J. M.]

Moucha, J., & D. Weiss, "Einiges über *Hyphantria cunea* Drury und *Spilosoma menthastri* Espenhan (Lepid.)" [in German]. *Nachr. Naturw. Mus. Aschaffenburg,* vol.39: pp.57-62, 2 pls. 1953. Careful comparison of these superficially similar arctiids. [P. B.]

Paclt, Jiří, "*Spectrum* Scop. a *Trochilium* Scop., dva zaniklé rody v Lepidopterologii" [in Czech, English summary]. *Folia Ent.*, vol.11: pp.25-28. 30 April 1948. Considers the genus *Spectrum* as isogenerotypic with *Sphinx L.* Consequently, selects one of four spp. contained originally in the work of Scopoli — *ligustri* L. — as the type of that genus. By this action a confusion in the nomenclature of Sphingidæ may be avoided. The subfamily names Sesiinæ and Chœrocampinæ (=Celerioninæ) are not available according to the *Règles*. The former must be called ÆLLOPINÆ nom.nov., the latter Deilephilinæ. As to the genus *Trochilium*, refers to the designation by Stephens, 1828, of *apiformis* as type. [J. M.]

Paclt, Jiří, "Nomenclator sive enumeratio critica Lepidopterorum Slovaciæ (Satyridæ-Sphingidæ)" [in Latin, Czech introduction]. *Folia Ent.*, vol.12: pp.140-155. 1949.

Paclt, Jiří, & Jiří Šmelhaus, "De dignitate spinulæ tibiæ anterioris in taxonomia generis *Plebejus* Kluk (Lep., Lycænidæ)" [in Czech; Russian & Latin summaries]. *Acta Soc. Ent. Cechoslovenicæ*, vol.49: pp.154-155. 15 Nov. 1952. Correction, *ibid.*, vol.50: p.252.

Patočka, Jan, "Contribution à la morphologie et au système des Pyralidides" [in Czech, French summary]. *Folia Ent.*, vol13: pp.107-109, 9 figs. 30 Oct. 1950. Describes as new *Paraponyx* (subg. PSEUDOPARAPONYX), type *stagnata* Don. [J. M.]

Patočka, Jan, "Die *Sarrothripus*-Arten als Schädlinge der Pappeln" [in Czech, Russian & German summaries]. *Fol. Zool. Ent.*, vol.2: pp.76-88, 1 pl., 8 figs. June 1953. Describes as new, from S. Slovakia, *S. populana* & *S. cuneana*; figures ♂ & ♀ genitalia of these & wing pattern of central European spp. Keys in German. [J. M.]

Pescott, R. T. M., "Lepidoptera of the Russell Grimwade Expedition." *Mem. Nat. Mus. Victoria*, no.17: pp.27-28, 1 pl. 1951. Describes as new *Thallarcha eremicola* (Balladonia, Western Australia) (Arctiidæ); figures wings. [I. C.]

Povolny, D., & F. Gregor, "Contributions to the knowledge of genus *Lithocolletis* Hb." [in English, German introduction]. *Folia Ent.*, vol.13: pp.33-36, 1 pl., 2 figs. 30 Apr. 1950. In the first part of the paper some information is given about *L. staintoniella* (Stt.). In the second part *L. cavella milleri* is described as new (Hodejovice, S. Bohemia). The foodplant of the nominate form is *Betula*; of the new ssp., *Prunus cerasus*. New ssp. figured in color. [J. M.]

Povolný, D., & J. Šmelhaus, "Československé druhy rodu *Procris* Fabr." [in English; Czech introduction & keys, Russian summary]. *Folia Ent.*, vol.14: pp.180-188, 2 pls., 22 figs. 1 Dec. 1951. All Czechoslovak spp. are figured in color; genitalia figured. Problems of nomenclature in *Procris* are discussed. [J. M.]

Povolný, Dal., & Jar. Zakopal, "Výskyt mola řepného (*Phthorimæa ocellatella* Boyd) v Maďarsku" [in Czech, Russian summary]. *Folia Ent.*, pp.97-106, 23 figs. 1 Oct. 1951. Information is given on systematics, bionomy and control. [J. M.]

Rindge, Frederick H., & William P. Comstock, "An unnamed lycænid from Trinidad (Lepidoptera)." *Journ. N.Y. Ent. Soc.*, vol.61: pp.99-100. June 1953. Describes as new *Echinargus huntingtoni* (Hololo Mt. Road, St. Ann's Trinidad, B. W. I.). [W.C.]

Rindge, Frederick H., "Synonymic notes on North American Geometridæ (Lepidoptera)." *Journ. N.Y. Ent. Soc.*, vol.61: pp.141-142. Sept. 1953. *Gueneria similaria*, new comb. replacing *G. basiaria; Syrrhodia sphæromacharia* replaced by *S. cruentaria;* species called *sphæromacharia* by Rindge, 1950 (*Amer. Mus. Novit.* no.1469) is now *coloraria.* [W.C.]

Rindge, Frederick H., "A revision of the genus *Tornos* Morrison (Lepidoptera, Geometridæ)." *Bull. Amer. Mus. Nat. Hist.*, vol.104: pp.177-236, 35 figs. 21 June 1954. Describes as new *T. capitaneus* (San Sebastian, Retalhuleu, Guatemala); *T. apiatus* (Paraguay); *T. phoxus* (San Sebastian, Retalhuleu, Guatemala); *T. hoffmanni* (Tehuacan, Puebla, Mex.); *T. brutus* (Volcan Turrialba, Costa Rica); *T. pusillus* (Cordoba, Mex.); *T. spinosus* (Juan Vinas, Costa Rica, 3000'); *T. mistus* (Buenavista, E. Bolivia); *T. scolopacinus spodius* (St. Petersburg, Fla.); *T. abjectarius ravus* (Port Sewall, Martin Co., Fla.); *T. a. kimballi* (Siesta Key, Sarasota Co., Fla.). Redescribes other spp.; figures genitalia of all. Keys to ♂ and ♀ genitalia, and to adults of the 12 forms occurring in the United States. [P.B.]

Rindge, Frederick H., "The butterflies of the Van Vorst-American Museum of Natural History expedition to the Bahama Islands, British West Indies." *Amer. Mus. Novit.*, no.1716: 20 pp., 8 figs. 25 March 1955. Describes as new *Lucinia sida albomaculata* (Port Nelson, Rum Cay); *Burca braco castibata* (New Portsmouth, Eleuthera Is.); *B. b. atrata* (The Bight, Cat Is.). Annotated list includes 42 other spp. [P.B.]

Rindge, Frererick H., "The type material in the J. B. Smith and G. D. Hulst collections of Lepidoptera in the American Museum of Natural History." *Bull. Amer. Mus. Nat. Hist.*, vol.106: pp.91-172. 25 April 1955. [See review in *Lepid. News*, vol.9: p.160.]

Rougeot, P. C., "Les Attacides (Saturnidæ) de l'Équateur africain français" [in French]. *Encycl. Ent.*, vol.34: 116 pp., 12 pls. (4 colored), 160 figs. 1955. Study of Attacidæ of French Equatorial Africa, with keys to subfamilies, tribes, genera, and species. The biology of the larvæ (bred by the author for many years) is described, with drawings. Describes as new: subtribes MELANOCERINI, BUNÆINI; *Nudaurelia oyemensis* (Oyem, Gaboon); *Gonimbrasia hecate* (Ivory Coast); *Athletes ethra albicans* (Oyem, Gaboon); *Epiphora intermedia* (Katanga). The species *nictitans* Fabr. is an *Imbrasia,* not a *Nudaurelia.* The nomenclature of this last genus is to be taken up again. [P.V.]

Salazar Torres, Juan, "El barrenarod del zapallo y de otras cucurbitaceas: *Melittia* sp." [in Spanish]. *Agronomía, Lima,* vol.19: pp.105-123, 2 figs. [1954?]. Detailed description of all stages of an unnamed species near *M. cucurbitæ.* [P.B.]

Sauter, W., "Zur Morphologie und Systematik der schweizerischen *Solenobia*-Arten (Lep. Psychidæ)" [in German]. *Mitt. Schweiz. Ent. Ges.,* vol.27: pp.429-434. 30 Dec. 1954. Morphological and systematic study of the Swiss species of *Solenobia.* Describes as new *S. seileri* (Goppenstein, Wallis); *S. goppensteinensis goppensteinensis* (Goppenstein, Wallis), *S. g. generosensis* (Monte Generoso, Tessin); *S. rupicolella* (Brugniasco, Tessin); *S. (Brevantennia) siederi* (Monte Generoso, Tessin). [P.V.]

Tindale, N. B., "On a new form of *Heteronympha penelope* Waterhouse (Lepidoptera Rhopalocera, family Satyridæ)." *Trans. Roy. Soc. So. Australia,* vol.75: pp.25-29, 1 pl., 1 fig. 1952. Describes as new *H. p. maraia* (Grampian Mts., western Victoria) and discusses the several races of this species. Figures the pupa and the wings of four subspecies. [I.C.]

Tindale, N. B., "New Rhopalocera, and a list of species from the Grampian Mountains, western Victoria." *Rec. So. Australia Mus.,* vol.11: pp.43-68, 4 pls., 4 figs. 1953. List of 39 species of butterflies recorded for this area; describes as new *Heteronympha banksii nevina* (Mt. Rosea, Victoria), *H. b. mariposa* (McPherson Range, Queensland). *H. solandri angela* (Mt. Rosea); *Pseudalmenus chlorinda fisheri* (Mt. Victory, Victoria); and *Hesperilla crypsargyra lesouefi* (Mt. William, Victoria). Figures immature stages of four sspp. and the wings of new and other races. [I. C.]

Tindale, N. B., "On a new species of *Œnetus* (Lepidoptera, family Hepialidæ) damaging *Eucalyptus* saplings in Tasmania." *Trans. Roy Soc. So. Australia,* vol.76: pp:77-79, 1 pl. 1953. Describes as new *O. paradiseus* (Ridgeway, Tasmania) and *O. p. montanus* (Mt. Gingera, Australian Capital Territory). Figures wings of *O. paradiseus* and *O. scotti.* [I. C.]

Tindale, N. B., "On some Australian Cossidæ including the moth of the Witjuti (Witchety) grub." *Trans. Roy. Soc. So. Australia,* vol.76: pp.56-65, 1 pl., 4 figs. 1953. Describes as new *Xyleutes biarpiti* (Ooldea Soak, South Australia) and redescribes and gives life history notes on two other species whose larvæ are sought as food by the aboriginals. Figures immature stages and the wings of both sexes. [I. V.]

Turner, A. J., "A revision of the Australian Phycitidæ, Part I." *Trans. Roy. Soc. So. Australia,* vol.71: pp.28-53. 1947. Describes as new in the subfamily Anerastriinæ: *Anerastria rhodochros* (Cape York, N. Queensland). *A. albivena* (Murrurundi, N.S.W.), *A. xylodes* (Cairns, N. Queensland), *A. clepsiphronica* (Brisbane, Queensland); *LIOPROSOPA* (type *Heosphora chlorogramma* Meyrick), *L. dimochla* (Brock's Creek, N. Australia), *L. phaulodes* (Dunk Island, Queensland), *L. pelopa* (Darwin, N. Australia), *L. phæochiton* (Cape York), *L. pachyzancla* (Cape York), *L. sporadica* (Cape York), *L. rhadinodes* (Dunk Island), *L. tanybela* (Lindeman Island, N. Queensland), *L. haploa* (Lindeman Island), *L. thiomochla* (Darwin, Dalby, Queensland); Kimberley, N.W. Australia), *L. colobela* (Gordonvale, N. Queensland), *L. platymochla* (Cunnamulla, Queensland), *L. transecta* (Injune, Queensland), *L. poliosticha* (Herberton, N. Queensland), *L. rhantista* (Lindeman Island); *ANCHYLOBELA*, and type species *A. haplodes* (Kuranda, N. Queensland); *Saluria stereochorda* (Bunya Mts., Queensland), *S. pelochroa* (Burnie, Tasmania); *ANARESCA,* and type species *A. xuthochroa* (Lindeman Island); *ALLOEA,* and type species *A. xylochroa* (Wyndham, N.W. Australia). Subfamily Phycitinæ: *ABARYS,* and type species *A. amaurodes* (Brisbane); *Ephestia pelopis* (Kuranda); *Homeosoma centosticha* (Brisbane; Bunya Mts.; Murrurundi), *H. rhapta* (Aramac and Stanthorpe, Queensland), *H. euryleuca* (Cape York), *H. contracta* (Murrurundi), *H. pelosticta* (Biloela, Queensland; Ebor, N.S.W.), *H. ochropasta* (Kuranda), *H. atechna* (Derwent Bridge, Tasmania); *Euzopherodes concinella* (Cape York), *E. homophæa* (Kuranda), *E. homocapna* (Cunnamulla), *E. schematica* (Cape York), *E. phaulopa* (Scone, N.S.W.); *SCYTHROPHANES* (type

Unadilla apatelia Turner); *Euzophera albicosta* (Denmark and Yanchop, Western Australia), *E. flavicosta* (Cape York), *E. ischnopa* (Cape York), *E. arrhythmopis* (Cairns and Redland Bay, Queensland); *EUAGETA*, and type species *E. arestodes* (Injune); *Cateremna cataxutha* (Darwin; Toowoomba, Queensland), *C. mediolinea* (Cape York), *C. leptoptila* (Broken Hill, N.S.W.), *C. melanomita* (Mackay, N. Queensland); *Tylochares epaxia* (Lake Barrine, N. Queensland), *T. prays* (Bunya Mts. and Stanthorpe, Queensland), *T. gypsotypa* (Cape York), *T. anaxia* (Cape York), *T. paucinotata* (Cape York), *T. chionopleura* (Warwick, Queensland), *T. endophaga* (Bribie Island, Queensland), *T. pastopleura* (Cape York); *Trissonca clytopa* (Kuranda); *Hypogryphia amictodes* (Duaringa and Toowoomba, Queensland); *Ancylosis thiosticha* (Injune). Type localities not specified; no figures included; keys to genera are provided. [I. C.]

Van Son, G., "A proposal for the restriction of the use of the term subspecies." *Lepid. News,* vol.9: pp.1-3. 8 April 1955.

Viette, P., "Étude d'une petite collection de Lépidoptères de la Réunion" [in French]. *Bull. Mus. Nat. Hist. Nat.*, ser. 2, vol.26: pp.506-510, 1 fig. Dec. 1954. Study of a small collection from Reunion Is. (Indian Ocean); describes as new *Metachanda hamonella* (Metachandidæ). [P. V.]

Viette, P., "Les travaux de S. Le Marchand" [in French]. *Rev. franç. Lépid.,* vol.14: pp.204-210. Jan. 1955. List of Le Marchand's publications and list of the types in his collection. [P. V.]

Viette, P. E. L., "Une nouvelle famille de Lépidoptères pour la faune malgache" [in French]. *Naturaliste Malgache,* vol.6: pp.71-73, 1 pl., 1 fig. March 1955. Family Eupterotidæ new to Madagascar. Describes as new *Jana palliatella.* [P. V.]

Viette, Pierre E. L., "Nouveaux Tineoidæ (s.l.) de Madagascar (Lep.)" [in French]. *Ann. Soc. Ent. France,* vol.123: pp.75-114, 32 figs. Jan. 1955. Describes as new: (Tineidæ) *Melasina decaryella* (central Madagascar), *M. vadonella* (N.E. Madagascar); *Monachoptilas paulianella* (S.E. Madagascar); *Sporadarthra vadonella* (N.E. Madagascar); (Lyonetiidæ) *Oinophila antongilella, O. herbulotella; Hieroxestis masoalella* (all from N.E. Madagascar); (Yponomeutidæ) *Parahyponomeuta malgassaella* (central S. Madagascar); (Ethmiidæ) *BETROKA,* and type *B. jacobsella* (central S. Madagascar); (Glyphipterygidæ) *Nigilgia seyrigella, N. toulgoëtella* (both from central S. Madagascar); (Ægeriidæ) *Tipulamima ivondro* (S.E. Madagascar), *T. seyrigi* (central S. Madagascar); *Lepidopoda xanthopimplæformis* (E. Madagascar), *L. sylvestralis* (E. Madagascar); *Malgassesia seyrigi* (N. Madagascar), *M. pauliani* (far S. Madagascar); *MICROSYNANTHEDON,* and type *M. ambrensis* (N. Madagascar); (Xylorictidæ) *Phracyps lebisella* (S.E. Madagascar), *P. longifasciella* (central Madagascar); *Exoditis vadonella, E. janineæ, E. sylvestriella, E. dominiqueæ* (all from N.E. Madagascar); (Œcophoridæ) *Eutorna punctinigrella; Tyriograptis elegantella* (both N.E. Madagascar); *Meleonoma diehlella* (central S. Madagascar); *Lasiomactra maisongrosella; Cryptolechia quadripunctella* (both N.E. Madagascar); (Cosmopterygidæ) *Mompha millotella* (E. Madagascar); *Pyroderces ocreella* (N.E. Madagascar); (Metachandidæ) *Metachanda benoistella* (central Madagascar), *M. rungsella* (N.E. Madagascar); (Gelechiidæ) *Dichomeris vadonella* (N.E. Madagascar), *L. decaryella* (E. Madagascar), *L. adelella, L. masoalella, L. mocquerysella, L. paulianella; Pachnistis nigropunctella* (all N.E. Madagascar). [P. V.]

C. MORPHOLOGY AND CYTOLOGY

Amanieu, Michel, "Effets de la section des sériciductes pratiquée sur des vers à soie (*Bombyx mori*)" [in French]. *C. R. Soc. Biol.*, vol.148: pp. 679-680. April 1954. Sectioning of silk gland ducts results in death at metamorphosis because silk is excreted into body cavity. [P. B.].

Edwards, George A., Persio de Souza Santos, Helena de Souza Santos, & Paulo Sawaya, "Electron microscope studies of insect muscle. III. Variations in ultra structure" [in English, Spanish summary]. *Bol. Zool. Univ. São Paulo*, vol.19: pp.391-406, 14 pls. 1954. Material included muscles from *Caligo beltrao* & *Thysania agrippina.* [P. B.]

Ezhikov, I. I., "Organization of bagworms of the genus *Fumea* (Lepidoptera, Psychidæ)" [in Russian]. *Trudy Inst. Morph. Zhivotnykh Akad. Nauk SSSR*, no.8: pp.154-169. 1953. [Not seen].

de Lesse, Herbert, "Formules chromosomiques nouvelles du genre *Erebia* (Lepid. Rhopal.)" [in French]. *C. R. Acad. Sci.*, vol.237: pp.758-759, 3 figs. 1953. Lists, with comments, chromosome numbers of *E. hispana rondoui, E. t. tyndarus, E. mnestra, E. scipio.* [P. B.]

de Lesse, H., "Nouvelles formules chromosomiques dans le groupe d' *Erebia tyndarus* Esp. (Lépidoptères Satyrinæ)" [in French]. *C. R. Acad. Sci. Paris,* vol.240: pp.347-379. Jan. 1955. Newly recorded chromosome numbers: *callias,* $n=15$; *nivalis,* $n=11$; *calcarius,* $n=8$; *tyndarus,* $2n=16$; *cassioides,* $2n=20$. [P.V.]

de Lesse, H., "Recherche de formules chromosomiques chez les *Zygæna*" [in French]. *Bull. Mens. Soc. Linn. Lyon,* vol.24: pp.142-144. June 1955. Records of chromosome numbers: *purpuralis,* $n=30$; *loniceræ,* $2n=$about 60; *fulvia* (=*achilleæ*), $2n=54$-55. [P.V.]

Moucha, J., "Forme intéressante des écailles des ailes de *Polyommatus bellargus* Rott. (Lep. Lycænidæ)" [in French]. *Bull. Soc. Ent. Mulhouse,* July-Aug. 1955: pp.35-36, 1 fig. Some interesting shapes of scales on the wings of *L. bellargus.* [P.V.]

Novák, Vladimír J. A., "Growth of the corpora allata during the postembryonal development in insects" [in English, Czech and Russian summaries]. *Acta soc. Zool Bohemoslovenicæ,* vol.18: pp.98-133, 8 figs. 16 June 1954. Discusses the development of corpora allata in *Ephestia kühniella* and *Bombyx mori,* among Lepidoptera. [J.M.]

Richards, A. Glenn, "Studies on arthropod cuticle. XI. The ecdysial membrane." *Journ. Morph.,* vol.96: pp.537-544, 5 pls. May 1955. Fine structure of a very thin (.15 micron) membrane found between pupal and adult cuticles of *Platysamia cecropia* and *Telea polyphemus.* [P.B.]

Shumakov, E. M., & L. A. IAkhimovich, "Morphologic and histologic characteristics of the metamorphosis of cotton bollworm (*Chloridea obsoleta* F.) and the phenomenon of diapause" [in Russian]. *Dokl. Akad. Nauk SSSR,* vol.101: pp.779-782, 2 figs. April 1955.

Tykač, Jar., "Sphragis ou sphragidoid chez les lépidoptères" [in Czech, French summary]. *Acta Soc. Ent. Čechosloveniæ,* vol.48: pp.127-131. 30 Nov. 1951. Information on morphology and description of abdominal pouch in *Polyommatus coridon.* [J. M.]

Waterhouse, D. F., "The occurrence and significance of the peritrophic membrane, with special reference to adult Lepidoptera and Diptera." *Austral. Journ. Zool.,* vol.1: pp.299-318, 2 pls., 5 figs. 1953. A tubular chitinous peritrophic membrane is reported in the adults of several lepidopterous families and in the adults of most cyclorrhaphous Diptera. [I. C.]

D. VARIATION AND GENETICS

Astaurov, B. L., "Polyploidy and parthenogenesis in silkworms (*Bombyx mori*). Report no.1: Producing triploid artificial parthenogenesis" [in Russian]. *Biull. Moskovskoe Obshch. Isp. Prirody,* vol.60: pp.37-64. March/April 1955. [Not Seen].

Beebe, William, "Polymorphism in reared broods of *Heliconius* butterflies from Surinam and Trinidad." *Zoologica, N.Y.,* vol.40: pp.139-143, 6 pls. 14 Nov. 1955. Describes variation in six broods of *H. erato* and *H. melpomene;* figures all offspring and known parents. [P.B.]

Bryk, F., "Zwei neue Schmetterlingsformen aus Finnland" [in German]. *Notul. Ent.,* vol.34: pp.139-140, 1 fig. 1954. Describes and names aberrations of *Tholera popularis* and *Apamea fucosa.* [W.H.]

Clarke, C. A., & P. M. Sheppard, "A preliminary report on the genetics of the *machaon* group of swallowtail butterflies." *Evolution,* vol.9: pp.182-201, 5 figs. 28 June 1955. Study of various crosses between *P. machaon, P. polyxenes asterius, P. brevicauda,* and *P. zelicaon,* with analysis of the genetics of some pattern characters of larvæ and adults. Hybrids are infertile except when backcrossed. [P.B.]

Dowdeswell, W. H., & E. B. Ford, "Ecological genetics of *Maniola jurtina* L. on the isles of Scilly." *Heredity,* vol.9: pp.265-272. Aug. 1955. Further data on the differences between small local populations as revealed by hind-wing spot number in females. [P.B.]

Elmhurst, Edward, "A butterfly experiment." *Country Life,* vol.118: pp.553-554, 5 figs. 15 Sept. 1955. On the effects of X-ray irradiation of *Pieris brassicæ;* treated and and marked individuals have been released at Ipswich, England, and abnormal descendants are to be sought. [P.B.]

Hanser, Gisela, "Eine neue glasflügelige Mutante (gl) von *Ephestia kühniella*" [in German]. *Zeits. Naturf.,* vol.10b: pp.161-166, 4 figs. March 1955. Describes a new recessive mutant with scaleless wings, and the expression and inheritance of the character. [P.B.]

Lucas, D., "Nouveaux lépidoptères pour la faune française" [in French]. *Bull Mens. Soc.*

Linn. Lyon, vol.24: p.230. Nov. 1955. Description of new aberrations of *Lycæna bellargus, Gluphisia crenata,* and *Agrotis constanti,* from the West of France. [P.V.]

Williams, J. R., "A note on intra-specific variation of chætotaxy in a lepidopterous larva." *Proc. Roy. Ent. Soc. London (A),* vol. 30: pp.82-86. 15 June 1955. Individual variation studies in some hundreds of specimens of *Cryptophlebia williamsi* (Eucosmidæ); variations minor except for one group of setæ. [P.B.]

Wolsky, Alexander, "The analysis of eye-development in insects as a tool in developmental genetics." *Anat. Rec.,* vol.122: p.472. July 1955. Abstract only.

E. DISTRIBUTION AND PHENOLOGY

Barrague, G., "Contribution à une faune des Lépidoptères Rhopalocères des environs d' Alger" [in French]. *Bull. Soc. Hist. Nat. Afr. Nord,* vol.45: pp.179-188, 1 map. 1954. Notes on the Rhopalocera in the Algiers district (Algeria). [P.V.]

Beebe, Ralph, "A new North American record and a second rarity." *Lepid. News,* vol.8: p.27, 1 fig. 25 Jan. 1954.

Bellinger, Peter, "The satyrid butterflies in the West Indies." *Nat. Hist. Notes Nat. Hist. Soc. Jamaica,* vol.6: pp.100-101, 2 maps. "May" 1954. Discusses distribution of the endemic genus *Calisto* and the possible geological origin of this distribution. [P.B.]

Biezanko, Ceslau M., "II. Acræidæ Heliconiidæ et Nymphalidæ de Pelotas e seus arredores" [in Portuguese]. Pelotas, Brazil (publ. by author). 16 pp., 1 pl., cover fig. 1949. Annotated checklist of Pelotas species, with 7 Acræidæ, 6 Heliconiidæ, 43 Nymphalidæ; *Metamorpha stelenes bipunctata* and *Hypolimnas misippus* figured. [C.R.]

Biezanko, Ceslau M., "VII. Sphingidæ de Pelotas e seus arredores" [in Portuguese]. Pelotas, Brazil (publ. by author). 8 pp., cover fig. 1948. Annotated checklist of Pelotas Sphingidæ, with 37 spp.; *Phlegethontius incisa* figured. [C.R.]

Bigot, L., & H. Stempffer, "Un lycène nouveau pour la faune européene: *Zizeeria karsendra* Moore" [in French]. *Rev. franç. Lépid.,* vol.14: pp.189-191. Nov. 1954. *Z. karsandra,* collected in Sicily, a new lycænid for the European fauna. [P.V.]

Bourgogne, J., "Un Rhopalocère américain observé sur la côte bretonne" [in French]. *Rev. franç. Lépid.,* vol.14: p.138. 1954. Record of the capture of *Vanessa virginiensis* on the French coast near St.-Nazaire. [P.V.]

Bourgogne, J., "La répartition française de *Liffia ferchaultella* Stph., espèce parthénogénétique (Psychidæ)" [in French]. *Rev. franç. Lépid.,* vol.14: pp.245-249. March 1955. Study of the distribution in France of this parthenogenetic psychid. [P.V.]

Brčák, Jaroslav, "L'essai sur la biocénologie des macrolépidoptèrcs du terrain tourbeaux situé près de Veseli dans le sud la Bohême" [in Czech; French summary]. *Folia Ent.,* vol.11: pp.92-111, 5 figs. 1948. Gives information about biotopes in this area and records the occurrence of 419 spp. [J.M.]

Brčák, Jaroslav, "Contribution à la connaissance des Lépidoptères des Hautes Tatras [in Czech, French summary]. *Acta Soc. Ent. Čechosloveniæ,* vol.48: pp.167-178. 3 figs. 1951. Lists 77 spp. from Vysoké Tatry (N. Slovakia). Describes and names aberration of *Anaitis præformata. Semasia mercuriana* new to Czechoslovakia. [J.M.]

Bros de Puechredon, E., "Lépidoptères de la Tremezzina (Lac de Côme)" [in French]. *Rev. franç. Lépid.,* vol.14: pp.211-217. Jan. 1955. List of Lepidoptera from Tremezzina (L. Como, N. Italy). [P.V.]

Brown, F. Martin, "Some notes on *Boloria* in central Colorado (Nyhphalidæ)." *Lepid. News,* vol.8: pp.64-66. 17 Sept. 1954.

Chalmers-Hunt, J. M., "Notes sur les Lépidoptères rencontrés en Belgique en 1953, avec quelques remarques comparatives sur ceux de Grande Bretagne" [in French]. *Lambillionea,* vol.54: pp.5-9. Sept. 1954. Collecting trip in Belgium with some remarks on some species found also in Great Britain. [P.V.]

Chermock, Ottilie D., "New records of Rhopalocera from southeastern Arizona." *Lepid. News,* vol.8: p.25. 25 June 1954.

Condamin, M., & H. Stempffer, "Lépidoptères Rhopalocères récoltés au Cameroun par C. de Raemy" [in French]. *Bull. Inst. Franç. Afr. Noire,* vol.15: pp.1037-1044. July 1953. Annotated list: 7 Papilionidæ, 1 Riodinidæ, 12 Acræidæ, 47 Nymphalidæ, 6 Danaidæ; appendix by Stempffer, 18 Lycænidæ. [P.B.]

Dekeyser, P., & A. Villiers, "Essai sur le peuplement zoologique terrestre de l'ouest africain" [in French]. *Bull. Inst. Franç. Afr. Noire,* vol.16: pp.957-970. July 1954. Characterizes the biogeographical regions of West Africa by brief lists of species, including Lepidoptera. [P.B.]

Diehl, M., "Liste des Lépidoptères Rhopalocères rencontrés au sud de Madagascar et surtout sur le plateau du sud" [in French]. *Naturaliste Malgache,* vol.6: pp.61-70. March 1955.

List of Rhopalocera collected in S. Madagascar, chiefly in the southern highlands. [P.V.]

Droit, P.-A., "Note sur les Lépidoptères Hétérocères du bassin moyen de la Durance" [in French]. *Entomologiste,* vol.9: pp.100-106. "1953" [March 1954]. List of the Heterocera (except micros and Geometridæ) collected in the French Alps. The genus *Spiris* is rightly employed for the species *striata* (Arctiidæ Lithosiinæ). [P.V.]

Eidkum, Frantisek, "Nový motýl pro Čechy — vakonoš *Psychidea pectinella* Den. et Schiff." [in Czech]. *Acta Soc. Ent. Čechosloveniæ,* vol.49: 235-236. 15 Dec. 1952. First record for Bohemia. [J.M.]

Ferguson, D. C., "The Lepidoptera of Nova Scotia. Part I. Macrolepidoptera." *Proc. Nova Scotian Inst. Sci.,* vol.23: pp.161-375, 16 pls., 7 figs., 1 map. Feb. 1954. Discusses faunal areas and local habitats. Annotated list of 68 butterflies and 764 macroheterocera, based on study of over 50,000 specimens. Food plants and other biological notes are given; a few larvæ (apparently previously unknown) are described. Notes on identification of some species in difficult groups (*Eubaphe,* deltoid noctuids among others). Some 220 figures of interesting specimens, with full data. (See review in *Lepid. News.* 8: 170; 1955.) [P.B.]

Hamilton, G. Rostrevor, "Butterflies in eastern France." *Country Life,* vol.110: p.1390. 26 Oct. 1951. Collecting in French Jura.

Herbulot, C., "Une intéressante acquisition pour la faune française: *Scopula rubellata* Stgr. (Lep. Geometridæ)" [in French]. *Bull. Soc. Linn. Lyon,* vol.23: pp.181-182. Sept. 1954. *S. rubellata* new for the French fauna, formerly known only from Spain. The citation of this species from Morocco by Oberthür applies perhaps to another species. [P.V.]

Hovanitz, William, "The biology of *Colias* butterflies. I. The distribution of the North American species." *Wasmann Journ. Biol.,* vol.8: pp.49-75. 1950. This paper gives distributional maps as well as verbal explanations of the distributions. There is a general discussion of the distribution of the genus from a world-wide viewpoint. This paper has many small comparative details of the type that become apparent only after long and painstaking study. A valuable piece of work. [J.T.]

Hrubý, Karel, "Some new and rare Lepidoptera in North-Eastern Bohemia" [in Czech; English summary]. *Acta Soc. Ent. Čechosloveniæ,* vol.48: pp.80-85. 1 Sept. 1951. Lists 43 spp. [J.M.]

Hrubý, Karel, "Tri nálezy vzácnějšich motýlů ve střednich Čechach" [in Czech; Russian summary]. *Acta Soc. Ent. Čechosloveniæ,* vol.49: pp.87-88. 1 Oct. 1952. 3 rare spp. from central Bohemia *(Chloroclystis coronata, Campæa honoraria, Harmodia xanthocyanea).* [J.M.]

Hrubý, Karel, "Further report on some interesting Lepidoptera in North-Eastern Bohemia" [in Czech; Russian & English summaries]. *Acta Soc. Ent. Čechosloveniæ,* vol.50: pp.56-61. 20 Jan. 1954. Interesting finds of Lepidoptera from Dvůr Králové (N.E. Bohemia). [J.M.]

Hrubý, Karel, "Some interesting Lepidoptera inside the city of Praha" [in Czech, Russian & English summaries]. *Acta Soc. Ent. Čechosloveniæ,* vol.50: pp.62-64. 20 Jan. 1954. Information on Lepidoptera captured in June and Sept. 1951, using the ultra-violet light. [J.M.]

Iwase, Tarô, "First *Danaus plexippus* caught in Japan." *Lepid. News,* vol.8: p.27, 1 fig. 25 June 1954.

Janmoulle, E., "Espèces nouvelles pour la faune belge" [in French]. *Lambillionea,* vol.54: pp.3-4. 1954. *Coleophora sternipenella, C. prunifoliæ, Nemophora pilulella, Adela congruella* new records for Belgium. [P.V.]

Janmoulle, E., "Espèces nouvelles pour la faune belge" — "Remarques sur la faune belge" [in French]. *Lambillionea,* vol.54: pp.33-34, 51-53. 1954. Notes on the Belgian fauna and two new records: *Argyresthia aurulentella* & *Coleophora glitzella.* [P.V.]

Janmoulle, E., "*Lithocolletis platani* Stgr. en Belgique" [in French]. *Lambillionea,* vol.54: p.34. 25 Aug. 1954. *L. platani* in Belgium, an introduced species. [P.V.]

Komárek, Oldrich, "Quelques microlépidoptères intéressants dans le Bassin supérieur du fleuve de l'Elbe (Bohême)" [in Czech, French summary]. *Acta Soc. Ent. Čechosloveniæ.* vol.48: pp.86-89. 1 Sept. 1951. Records 17 spp. and their distribution in Bohemia. [J.M.]

Komárek, Oldrich, "*Zygæna læta* Hb. et sa répartition en Bohême (Zygænidæ)" [in Czech, French summary]. *Acta Soc. Ent. Čechosloveniæ,* vol.48: pp.179-181. 15 Dec. 1951. Information on this sp. in Bohemia. [J.M.]

Králiček, Milan, "Hřbetozubec *Odontosia sieversi* Mén. a jeho výskyt na Uherskohradištsku" [in Czech]. *Acta Soc. Ent. Čechosloveniæ,* vol.49: pp.240-241. 15 Dec. 1952. New record from district Uherské Hradistě (S.E. Moravia). [J.M.]

MINUTES OF THE SIXTH ANNUAL MEETING OF THE LEPIDOPTERISTS' SOCIETY

The sixth Annual Meeting of The Lepidopterists' Society was held at the Archbold Biological Station, near Lake Placid, Florida, on 28-30 December 1955.

The first day was of an informal nature, with arrivals, registration, and accomodation arrangements. Almost all of the members and guests were housed at the Station, and all meals were served at the Station at one big table, which made possible a spirit of warm camaraderie among those attending. In the afternoon there was an escorted tour of the excellent facilities and beautiful grounds of the Station, including a visit to the Lepidoptera foodplant garden developed for Dr. REMINGTON'S research.

On Thursday, the 29th, an early tour of the extensive grounds was conducted by RICHARD ARCHBOLD, Director of the Station, primarily for those who had not arrived on Wednesday. After the return to the laboratory meeting room, the formal meeting was called to order by C. L. REMINGTON and commenced with welcoming remarks by Mr. ARCHBOLD. STANLEY V. FULLER presided over the morning session. The first paper was given by CHARLES P. KIMBALL on the history of lepidopterology in Florida: WILLIAM BARTRAM in 1774 published the first paper on Florida butterflies, with 3 figures: other early Florida collectors were DOUBLEDAY, in the 1830's, CHAPMAN and KOEBELE, from the 1860's to 1880's, DYAR (who did much with Microlepidoptera), and ANNIE TRUMBULL SLOSSON, both in the 1890's; most notable among later collectors, in addition to those present at the meeting, were FRANK MORTON JONES, DEAN F. BERRY, and Mrs. MARGUERITE FORSYTH. Mr. KIMBALL then gave a progress report on his Florida checklist, which he expects to complete this summer. Next, C. L. REMINGTON explained the structure of the forthcoming DOS PASSOS list of North American Lepidoptera; the first part will be a checklist, followed by a catalog. E. G. MUNROE's brief paper on the international holotype-photographing project was given in his absence by Dr. REMINGTON (*see Lepid. News* 9: 140-141).

A round-table discussion on techniques followed, including: a description of the hand-pairing technique, by Dr. REMINGTON; the collecting of Sphingidæ, by MARGARET M. CARY; the collecting of Heliothid moths, by ROWLAND R. MCELVARE; collecting *Megathymus* skippers in Florida, by H. L. KING; the use of ultra-violet lamps and light traps, by H. V. WEEMS, JR., and Mr. KIMBALL; and preserving larvæ and pupæ for a study collection, by Dr. REMINGTON.

After lunch, Mr. KING was in the Chair. There was a general discussion on migration, with comments by almost everyone present, and two specific papers: one on the habits of *Brephidium pseudofea* larvæ and adults in the salt marshes at Vero Beach, Florida, given by JAMES S. HAEGER, and a paper to appear in the *News*, prepared by GEORGE and EDWARD AUSTIN, entitled "What's in Your Backyard?", read by Dr. REMINGTON.

At the end of this paper-reading session, the annual Business Meeting of the Society was held, with Mr. MCELVARE presiding. An informal Treasurer's Report was read for Mr. HESSEL and discussed at length with other Society matters. Florida lepidopterists who were present established an informal organization with the aim of frequent gatherings, especially for field explorations and perhaps one or more meetings each year.

Upon motion duly made, seconded, and unanimously voted, it was RESOLVED that The Lepidopterists' Society convey its great appreciation to Mr. RICHARD ARCHBOLD for the superb arrangements and generously extended facilities for the 1955 meetings and to Mrs. HAZEL EWING, hostess of the Archbold Biological Station, for the unsurpassed meals.

Thursday evening was devoted to an Illustrations Session.. Mr. HAEGER showed a colored motion picture of the migration of *Ascia monuste*. The film had been made by Dr. ERIK T. NIELSEN and Mr. HAEGER on the east coast of Florida and had been sent from Dr. NIELSEN's laboratory in Iraq specifically for this meeting. The Pierid butterflies had been sprayed with dye and were observed at distances up to 90 miles from the marking site. Dr. REMINGTON then gave a talk on the principles of Lepidoptera mimicry, illustrated with kodachrome slides.

The final meeting was held Friday morning with W. M. DAVIDSON presiding. Three papers were given: "Biogeography of the Sphingidæ of the Antilles", by Mrs. CARY; "Problems of Speciation in Megathymids and of Foodplant Specificity in Lepidoptera", by Dr. REMINGTON; and "Species Criteria and the Problem of Extreme Rarity in Heliothid Moths", by Mr. MCELVARE.

The following members and guests attended part or all of the Florida meeting: DEAN AMADON, RICHARD ARCHBOLD, MARGARET M. CARY, W. M. DAVIDSON, WALLACE DEKLE, H. A. DENMARK, STANLEY V. FULLER, JAMES S. HAEGER and JIMMY, Mr. and Mrs. B. C. HASTINGS, L. A. HETTRICK, Mr. and Mrs. GEORGE W. KAMP, Mr. and Mrs. CHARLES P. KIMBALL, Mr. and Mrs. H. L. KING, Mr. and Mrs. ROWLAND R. MCELVARE, Dr. and Mrs. CHARLES L. REMINGTON and ERIC, Mr. and Mrs. A. H. SCOTT, H. V. WEEMS, JR.

Respectfully submitted,
JEANNE E. REMINGTON
Secretary *pro tempore*

MEMBERS AND GUESTS ATTENDING THE MEETING, 29 DECEMBER

Left to right, standing: KIMBALL, KAMP, WEEMS, MCELVARE, DEKLE, DAVIDSON, REMINGTON, KING, SCOTT, HAEGER, FULLER.

Seated: Mrs. KIMBALL, Mrs. KAMP, Mrs. MCELVARE, Mrs. CARY, Mrs. REMINGTON, Mrs. KING, Mrs. SCOTT, JIMMY HAEGER.

(Photograph by RICHARD ARCHBOLD)

PRESIDENTIAL LETTER TO 1954 MEETING OF PACIFIC SLOPE SECTION OF THE LEPIDOPTERISTS' SOCIETY*

Ladies and Gentlemen, my dear colleague Lepidopterists!

Although I am separated from you by thousands of miles of land and ocean, I now have the great privilege and pleasure to convey to you my personal greetings and to wish you all an agreeable and successful meeting. For, to use my favourite citation of an American lepidopterist, BRACKENRIDGE CLEMENS: ". . . Science is not limited by the boundaries of countries . . . nor restricted in its range of sympathies by distance".

Although I have not been able so far to attend meetings of our Society personally, it was with warm interest that I closely followed them, since rather soon after its foundation, its quick growth and prolific development, and I now wish to congratulate its founders with their idea of an international society of lepidopterists that proved to be so welcome and so fertile.

On the border of two Continents, Asia and Australia, lies a region that since WALLACE'S time is the El Dorado of the naturalist. Here meet two extremely different faunas, in conditions that are optimal for vegetable and animal life. The highly complicated geological history of this region, and its present state of an archipelago, all contribute to the forming of one of the richest faunas of the Tropics. The largest island of this region, New Guinea, is the most promising for exploration, and it is no wonder that for a long time it had a strong attraction for naturalists. Recently special attention is being paid to this country. The knowledge of its fauna in general and of its lepidopterous fauna in particular is being quickly enriched. Several Dutch expeditions and American expeditions led by RICHARD ARCHBOLD brought home extremely rich material, that presents fascinating problems of taxonomy, zoogeography, and ecology. I wish to discuss with you briefly one of these problems, viz., the mysterious tendency to white and black colouring.

This tendency is manifest by a frequent occurrence in New Guinea of Macroheterocera and Microlepidoptera with a white ground colour and black markings of a similar pattern. This feature has already been noticed by MEYRICK. In a paper on Papuan Microlepidoptera (1938) he observes:

"As an interesting special characteristic of this Papuan mountain fauna, I remark the strong and unusual tendency to white and black colouring distinctly contrasted, and evidently in this case serving a protective purpose, being, as I think, imitative of bird excrement, and indicating the influence of a large insect-eating element in the fauna, such for instance as the Birds of Paradise. I have not overlooked the possible effect of such insects being easily noticeable to a human collector, but this would be equally the case in any fauna, and this particular fauna is in my opinion more remarkable for the prevalence of this colouring than any other in the world." (p. 503).

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*Editor's note: Dr. Diakonoff's letter was temporarily misplaced and was not found in time to be published with the minutes of this meeting. — C. L. R.

In the material that I was able to study, the phenomenon of white and black colouring is also present but occurs not as frequently as one would expect from the above citation; it is highly peculiar nevertheless.

A silvery or snow-white ground colour of the fore wing with a series of black blotches or a black streak along the posterior part of the costa, mostly combined with a series of narrow interconnected dentations along the endings of the terminal veins, preceded by a pale yellow suffusion, is the characteristic pattern of the extensive Tortricid genus *Chionothremma.* Some 20 species are in possession of this pattern which may vary to some extent: the black terminal markings are often reduced, or there is a continuous marginal line, or only the apex of the fore wing bears a black dot. The closely allied monotypic *Diphtheropyga* is similarly coloured. This colouring in itself is very peculiar in the rather uniform ochreous, fuscous, or brownish leaf rollers. Perhaps it may have developed in correlation with the diurnal life habits of *Chionothremma.*

Still more striking is the occurrence of very similar colouring and markings in certain species of other Tortricidæ and also in quite distant families of Microlepidoptera.

The closest likeness with the *Chionothremma* pattern can be found in certain species of the Tortricid genus *Chresmarcha.* This genus belongs to another tribe of the Tortricidæ (Cacœciini) and is, in fact, remote from *Chionothremma* (tribe Zacoriscini). Two species are known which very closely imitate the primary white and black pattern: the same costal markings, terminal streaks and even the pale yellow suffusion are present; moreover *Chresmarcha sybillina* possesses an additional transverse series of black blotches, absent in *C. delphica.* The colouring of these species of *Chresmarcha* is so deceiving that for a long time they have been erroneously classified.

The extraordinary imitating ability of *Chrasmarcha* is still more clearly demonstrated by the third species (*C. enæmargyrea*) which is a close mimic of a quite different pattern of colouring, characteristic of certain genera of the Callidulidæ (*e.g.,* of many species of *Damias*), viz., the white basal and the deep wine-red apical half of wing, the halves divided by a black streak. The fact that *Chresmarcha* imitates two such different patterns strengthens me in my surmise that we have to do with a phenomenon of mimicry, the pattern of *Chresmarcha sybillina* and *C. delphica* being a secondary imitation of the primary "example" pattern of *Chionothremma* and *Damias,* respectively. Another, not less striking, example of white and black colouring of a similar pattern represents *Meridarchis pseudomantis,* a single species out of 22 species of this genus known to occur in the Papuan region, resembling the above mentioned Tortricidæ — except for the narrower wings, characteristic for the entire family Carposinidæ, to which this species belongs — and entirely different from all other *Meridarchis* species known.

Unfortunately the large recently made collections of Macroheterocera of New Guinea are not studied yet, and I am not able to provide the names of several other examples of white and black colouring, occurring in that group; I shall mention two of them.

A small Arctiid of a quite deceiving Tortricoid facies is another mysterious double of *Chionothremma.* When arranging the genera and species preliminary to study I promptly put the unique specimen of this species in the *Chionothremma* lot, until closer observation revealed its true nature.

A Lithosiid of quite similar white and black markings was somewhat less puzzling, on account of its typical facies characteristic of that family.

Undoubtedly many other examples could be found among small Heterocera from New Guinea or will be discovered in future.

The intriguing problem which I am unable to solve is: what character must be ascribed to this phenomenon? Three possibilities may be indicated.

1. The phenomenon is a case of mimicry, viz., imitation of colour and markings of common forms (*e.g.,* different species of *Chionothremma*) by single representatives of distant families and genera which in this way become entirely dissimilar to their congeners, which might have some connection with their biology.

2. The phenomenon may be due to a common influence or "creative agent" typical of New Guinea, through which white and black markings originate polyphyletically in different families and genera, independent of the biology of the insects in question. Apparently this is what MEYRICK thought.

3. The white and black pattern might be some consequence of the change of former nocturnal life habits of small New Guinean Heterocera to diurnal habits, with which we intend to say that also in this case a common cause may be at play but that this cause would be of an entirely different nature than the "agent" alluded to in paragraph 2.

Our generation might be less disposed to teleological statements than was that of MEYRICK. His elegant explanation of the phenomenon in question, cited above, will probably appear too simplified for present tastes. Extensive study of ecology might help us some time to solve this fascinating problem, one of so many in the Nature of this wonderful island, New Guinea.

A. DIAKONOFF
Rijksmuseum van Natuurlijke Historie, Leiden, THE NETHERLANDS

NOTICES

Lepidopterists' Society members may use this page free of charge to advertise their offerings and needs in Lepidoptera. The Editors reserve the right to rewrite notices for clarity or to reject unsuitable notices. We cannot guarantee any notices but expect all to be *bona fide.*

I am open to collect all species of Georgia Rhopalocera; will exchange for Formosan Rhopalocera. Also have many papered Papilios. James C. Brooks, 194 Riley Ave., Macon, Georgia, U. S. A.

Would like to exchange. I can offer Japanese and Formosan butterflies and some Japanese moths. Wish to have Lepidoptera (esp. butterflies) of all parts of the world. Hiraku Horii, No.175, 50-Banchi, Oguracho, Kitashirakawa, Sakyo, Kyoto, JAPAN.

Wanted: Ova/pupæ *Everes comyntas, E. amyntula, Colias eurytheme, Eurema lisa, Limenitis archippus, Precis lavinia, P. polyxenes asterius,* and *P. glaucus* (preferably from black female). Will exchange for British Rhopalocera live ova/pupæ or papered specimens. G. H. Phillips, Post Office, Far Sawrey Ambleside, ENGLAND.

Would like to exchange Japanese butterflies for those from anywhere in the world. Correspondence invited. Yoshiharu Jingo, 1478 Nippori-3, Arakawaku, Tokyo, JAPAN.

Boloria distincta Gibson, *Erebia youngi herscheli,* etc., from Yukon, N.W.T. border, for sale. Colin Wyatt, Cobbetts, Farnham, Surrey, ENGLAND.

Wanted: Papered Rhopalocera, esp. Nymphalidæ and Pieridæ (*Colias*) from all parts of North America, esp. mountains. Material from foreign countries also desired. Will exchange for the above species from the Formosan Central Mts., Europe, and Wisconsin. Exchange list on request. Donald L. Baber, 1511 Drake Ave., Burlingame, Calif., U.S.A.

I need urgently the following for study: adult specimens, pinned or papered, with full data, of all species, subspecies, and forms of North American *Limenitis.* Also need living pupæ of the above. Will purchase *or* exchange extremely limited stock of District of Columbia and adjacent Maryland butterflies; will have many more specimens for exchange this summer. Ward Watt, 1206 Parker Ave., Hyattsville, Md., U.S.A.

For sale: *Œneis, Erebia, Colias,* and *Boloria* from far Northern Canada at reasonable prices. R. J. Fitch, 2235 Pandora St., Vancouver, B.C., CANADA.

For sale: Barnes, McDunnough, and others: *Contributions to the Natural History of the Lepidoptera of North America*: Vols. 1-4, half leather; Vol.5, paper covers. Excellent condition. Inquiries to Prof. B. Hocking, Dept. of Entomology, University of Alberta, Edmonton, Atla., CANADA.

For sale: 1955-56 *ex larva,* carefully papered adults of *Triodes* (= *Ornithoptera*) *urvilliana, victoria; Papilio woodfordi, rhadamantus; Attacus atlas lorquini.* Max Richter, Butterfly Farm, East Durham, N.Y., U.S.A.

Have several thousand European butterflies and moths, papered, named, with full data, about 300 different species, for exchange against butterflies from the Americas, Asia, Australia or Africa. Will help build up representative coll. of European Lepidoptera. T. W. Langer, Royal Library, Copenhagen, DENMARK.

Alaskan butterflies for sale: *Parnassius eversmanni* ♂ A $5.00, ♂ B $4.00; *Papilio machaon aliaska* ♂ A $4.00, ♂ B $2.75; *Œneis jutta alaskensis* ♂ A $3.00, ♂ B $2.00, ♀ A $4.00, ♀ B $3.00. "B" specimens have small nicks or tails missing. All specimens have complete data including altitude. Will consider exchange for desired Nearctic *Erebia* (Arctic material only). P. R. Ehrlich, Dept. of Entomology, University of Kansas, Lawrence, Kansas, U. S. A.

EDITORIAL CHANGES

Mrs. JEANNE E. REMINGTON has resigned as Associate Editor of the *News,* due to the pressure of new activities at Yale University. Her successor has not been determined. I wish to record my deep gratitude for her very large part in producing the *News* during these first nine years.

Prof. JAMES R. MERRITT, who is responsible for the new "Collectors" section of the *News,* is now Associate Editor in a new position replacing the supervisor of the Season Summary. For lack of an editor, the Summary has been discontinued, at least temporarily. Summary material is on hand for the 1953 and 1954 seasons, and it is hoped that this can be edited and published before much longer.

CHARLES L. REMINGTON

All nominees for 1956 officers of The Lepidopterists' Society received over 99% of the ballots cast and were duly recorded by the Secretary as elected. Prof. Dr. HERING was elected an Honorary Fellow.

ADDITIONS TO THE MEMBERSHIP LIST

Beal, Jno L., 309 South York St., Gastonia, N. C., U. S. A.
Brooks, James C., 194 Riley Ave., Macon, Ga., U. S. A.
Carlton, Towomi, James-Barry-Robinson Home for Boys, Kempville Rd., Norfolk 2, Va., U. S. A.
Ford, D. G., c/o Rock Island Freight Office, Joliet, Ill., U. S. A.
Gingell, L. V. H., South Farnborough Preparatory School, Reading Rd., Farnborough, Hants., ENGLAND.
Graybill, Richard, 1225 Rosemont Lane, Abington, Pa., U. S. A.
Horii, Hiraku, No. 175, 50-Banch, Oguracho, Kitashirakawa, Sakyo, Kyoto, JAPAN.
Kight, Paul, Norman Rd., Clarkston, Ga., U. S. A.
Klein, Martin, 4746 Kraft Ave., North Hollywood, Calif., U. S. A.
Mark, Victor (Dr.), 250 ½ N. Mills St., Claremont, Calif., U. S. A.
Phillips, Geoffrey H., 67 Alexandra Rd., Blackpool, ENGLAND.
Ragsdale, Edith L. (Mrs.), 429 N. Marion St., Centralia, Ill., U. S. A.
Ross, Douglas, 26 Tichester Rd., Apt. 107, Toronto, Ont., CANADA.
Serrano, M. E., Esq., 188a, Fulham Rd., London S. W. 10, ENGLAND.
Symmes, John, 3198 Mathieson Drive N. E., Atlanta, Ga., U. S. A.
Thoveron, Clothilde, 186 Almond St., Georgetown, BRITISH GUIANA.
Vaněk, Jaroslav, 19, Přístavní, Praha 7, CZECHOSLOVAKIA.
Vokoun, William, Jr., Fourth Ave. and Rose St., Downers Grove, Ill., U. S. A.
Weems, Howard V., Jr. (Dr.), State Plant Board of Florida, Seagle Bldg., Gainesville, Fla., U. S. A.

THIRD ANNUAL PACIFIC SLOPE MEETING ANNOUNCED

Western members of The Lepidopterists' Society will hold their 1956 meeting in Santa Barbara, California on August 4 and 5. NELSON W. BAKER, entomologist at the Santa Barbara Museum of Natural History, will handle local arrangements. W. LEVI PHILLIPS of Salt Lake City is the third member of the Program Committee. One feature of the program will be a symposium for discussing the usefulness of genetics, statistics, ecology and morphology in the taxonomy of Lepidoptera.

FRED THORNE, Program Chairman

THE LEPIDOPTERISTS' SOCIETY

1956 OFFICERS

President: Thomas N. Freeman (Ottawa, Canada)
1st Vice President: John A. Comstock (Del Mar, Calif., U. S. A.)
Vice President: Georg Warnecke (Hamburg, Germany)
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Treasurer: Sidney A. Hessel (Washington, Conn., U. S. A.)

EXECUTIVE COUNCIL

Term expires Dec. 1956: Jean Bourgogne (Paris, France)
Don B. Stallings (Caldwell, Kansas, U. S. A.)

Term expires Dec. 1957: E. B. Ford (Oxford, United Kingdom)
Nicholas S. Obraztsov (Sea Cliff, N. Y., U. S. A.)

Term expires Dec. 1958: G. van Son (Pretoria, South Africa)
D. C. Ferguson (Halifax, Canada)

and *ex-officio:* the above officers and the Editor-in-Chief

The object of The Lepidopterists' Society, which was formed in May, 1947, and formally constituted in December, 1950, is "to promote the science of lepidopterology in all its branches, ... to issue a periodical and other publications on Lepidoptera; to facilitate the exchange of specimens and ideas by both the professional worker and the amateur in the field; to secure cooperation in all measures" directed toward these aims (*Constitution,* Art. II). A special goal is to encourage free interchange among the lepidopterists of all countries.

Membership in the Society is open to all persons interested in any aspect of lepidopterology. All members in good standing receive *The Lepidopterists' News.* Institutions may subscribe to the publications but may not become members. Prospective members should send to the Treasurer the full dues for the current year, together with their full name, address, and special lepidopterological interests. All other correspondence concerning membership and general Society business should be addressed to the Secretary. Remittances in dollars should be made payable to *The Lepidopterists' Society.* There are three paying classes of membership:

Active Members - annual dues $4.00 (U. S. A.)
Sustaining Members - annual dues $10.00 (U. S. A.)
Life Members - single sum $75.00 (U. S. A.).

Dues may be paid in Europe to our official agent: E. W. Classey, 91 Bedfont Lane, Feltham, Middx., England.

Each year a list of members of the Society is published in the *News,* with addresses and special interests. There are six numbers in each volume of the *News.*

All members are expected to vote for officers when mail ballots are distributed by the Secretary each year.

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(Complete contents on back cover)

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THE LEPIDOPTERISTS' NEWS

Volume 10 1956 Numbers 3-4

A NEW CONCEPT FOR THE *CŒNONYMPHA* OF THE FRONT RANGE OF COLORADO (SATYRIDÆ)

by WILLIAM N. BURDICK

In the preparation of a revision of the genus *Cœnonympha* of North America it became apparent that the *Cœnonympha* of the Front Range of Colorado should be elevated to racial distinction. This race has formerly been referred to as *Cœnonympha ochracea* Edwards, but a comparison with the known printed figures and scores of specimens of *C. ochracea* that conform to EDWARDS' description of this butterfly prove that the deviation is sufficient to permit a recognizable separation from *C. ochracea.* The large majority of the specimens found in this region are quite constant in the characters that distinguish them.

SKINNER (1900) published a colored illustration of this butterfly in his revision of the genus (figure 13, from Bear Creek, Colorado, near Morrison). This illustration excellently exemplifies a typical figure of this population but it is erroneously designated as *C. ochracea* to which it is quite atypical. The correct figure that conforms to EDWARDS' description of *C. ochracea* is the accompanying figure 14, from Park City, Utah. A comparison of these figures leaves no doubt that they are quite distinguishably different in appearance.

DAVENPORT (1941) illustrates in black and white (plate 10, figure 38) the underside of this Front Range race, which he designates as *C. ochracea.* In adjacent figures, one from Yellowstone Park, Wyoming, and another from some unspecified locality in Utah, he illustrates specimens of typical *C. ochracea.* It is clear that he also missed the dissimilarity, as have many others, that is so apparent between these two populations.

For the sake of consistency it seems appropriate to establish a complete separation between *C. ochracea* and its relative in the Front Range. This should help to clarify the status of *C. ochracea* which has been the subject of much speculation. As other populations have been separated by means of the absence or obsolescence of ocelli and ground color a parallel treatment in this case must certainly be in order.

The description of the race from the Front Range of Colorado follows.

Cœnonympha inornata phantasma new subspecies

MALE. Upperside evenly colored light orange-yellow, except along the inner margin of the secondaries to about the sub-median vein, where the color becomes light

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gray. The grayish-white fringes are in striking contrast to the ground color of the wings, and they are well developed.

On the underside the primaries have one apical ocellus on each wing and it is prominent as in *C. ochracea* and *C. benjamini.* The general appearance of the primaries is very similar to that of *C. ochracea* except that the gray apical area is usually darker and somewhat more extensive. The obsolescent sub-marginal ocelli on the under side of the secondaries are a standard feature of *phantasma.* They are impressively in contrast to the robust sub-marginal ocelli featured by *C. ochracea.* MCDUNNOUGH says, "that only occasionally does *C. benjamini* show traces of weak sub-marginal ocelli on the secondaries." The pale, irregular shaped basal spots on the secondaries, definitely not a character of *C. benjamini,* are normally present in *phantasma* but are usually of slightly less magnitude than those seen in *C. ochracea.* Sometimes they are slightly obscure, but this is not the rule. The pale straight ray on the primaries and the tortuous ray on the secondaries are quite variable in extent, just as they are in other races of *Cœnonympha.* It should be emphasized that the description of *C. ochracea* states that the ground color of the undersides of the secondaries is "light reddish-brown." In *phantasma* it is definitely greenish-gray.

FEMALE. There seems to be no sexual dimorphism with the exception that the female is often slightly larger.

HOLOTYPE male (expanse 28 mm.): Eldora, Boulder Co., Colo., 21 June 1941, *leg.* DONALD EFF.

ALLOTYPE female (expanse 30 mm.): same locality and collector as HOLOTYPE, 9 July 1937.

HOLOTYPE and ALLOTYPE deposited in the collection of the Los Angeles County Museum at Los Angeles, California.

PARATYPES (twenty-six in all): Twenty paratypes in the collection of the author with the following data will be distributed among the following collections:

The Peabody Museum of Natural History, Yale University, New Haven, Conn.: one male, 23 June 1941, and one female, 9 July 1937, both Eldora, Boulder Co., Colo., *leg.* P. S. & C. L. REMINGTON.

The Carnegie Museum, Pittsburgh, Pa.: one male, 21 June 1941, and one female, 9 July 1937, both Eldora, Boulder Co., Colo., *leg.* P. S. & C. L. REMINGTON.

The United States National Museum, Washington, D.C.: one male, Tolland, Gilpin Co., Colo., 15 June 1951, *leg.* DONALD EFF; one female, Eldora, Boulder Co., Colo., 9 July 1937, same collector.

The American Museum of Natural History, New York, N.Y.: one male, Eldora, Colo., 9 July 1937, *leg.* DONALD EFF; one female, Tolland, Colo., 6 July 1953, same collector.

The Canadian National Museum, Ottawa, Canada: one male, Tolland, Colo., 6 July 1953, *leg.* DONALD EFF; one female, Eldora, Colo., 21 July 1941, same collector.

Fourteen paratypes are in the collection of the author: four males, Eldora, Colo., 21 June 1941, and one male, Sugar Loaf Mountain, Boulder Co., Colo., 19 May 1948, all collected by DONALD EFF; four males, Eldora, Colo. (27 June 1937, 18 June and 2, 8 July 1941) and one female, Eldora, Colo. (7 July 1937), all collected by P. S. & C. L. REMINGTON.

Six specimens in the collection of the Los Angeles County Museum are also designated as paratypes: three males from Tolland, Colo., 4 July 1951; one male from Tolland, Colo., 26 June 1953; one female, Caribou, Boulder Co., Colo., 15 July 1951, all collected by DONALD EFF; one male from Tolland, Colo., 9 July 1935, *leg.* F. M. BROWN.

The average measurement of thirteen male paratypes from the base to the wing tip is 16-17 mm. That of four female paratypes is 17-18 mm.

The elevations of the area from which the type series came are Eldora 8800 ft., Tolland and Caribou 9500 ft., and Sugar Loaf Mt. 8000 ft.

A number of other specimens that appear to belong to the new race have been collected at Fraser, Grand Co., Colo., and Chautauqua Mesa, Gregory Canyon, Plainview, and a number of nearby localities in Boulder Co., Colo., during May, June, and July.

The specific name *inornata* has been selected, as the author's treatment of the genus, now in preparation, divides American *Cœnonympha* into three species: *C. california* Westwood & Hewitson (white), *C. inornata* Edwards (yellow), and *C. haydenii* Edwards (brown) having similar differences in color and other features as are noted in the study of anthropology. The subspecies *inornata* represents a race of probably later establishment than *C. ochracea,* considering the movement of the continental glaciers. However, the name *inornata* has line priority over the name *ochracea* and therefore must be considered as the name for the yellow races of American *Cœnonympha.* The Asiatic name *tullia* seems unacceptable for American species inasmuch as it is based upon a very questionable theory, in fact one that presents many negative elements. This opinion will be elaborated at length in a subsequent paper in which the application of the name *tullia* will be discussed.

Apparently *phantasma,* which inhabits localities of considerable altitude, is single brooded as are the other races of *Cœnonympha* that are found in regions where boreal influences prevail.

Treatment of the genitalia is here omitted, because with the possible exception of *C. haydenii,* the genitalia of all American *Cœnonympha* are so similar that useful taxonomic characters have not yet been found.

Because of the fact that *phantasma* has in the past been confused with *ochracea* it seems pertinent to discuss here some of the opinions previously recorded on this subject. In the Carnegie Museum at Pittsburgh the single type specimen of *C. ochracea* may be seen. It is labeled "Lake Winnipeg." This single specimen conforms to EDWARDS' description of that race. It seems evident that sometime later specimens from another locality were acquired. EDWARDS apparently believed that these, which were labeled as from "Col." and "Colo.," bore similarity to his lone female type. A number of these were deposited with the type. This served to confuse the status of *C. ochracea* because these Colorado specimens do not conform to the description, and they differ quite noticeably from the type specimen. Typical *C. ochracea* occurs in western Colorado, Utah, and Nevada, but its appearance is quite different from that which DAVENPORT designates as the "Rocky Mountain race." Colorado is a state of large extent in which there are rather extreme and varied climatic conditions. The ambiguous locality "Colo." is insufficient grounds for racial establishment, and it is far removed from the original type locality. DAVENPORT wrote, "A careful examination of EDWARDS' description of *ochracea* will show one that it is an accurate description of the Rocky Mountain race; he stresses the strong row of ocelli and the similarity of males and females." DAVENPORT'S figures of this Rocky Mountain race certainly do not show a strong row of ocelli. On the contrary it is quite obvious that the "Rocky Mountain race" is very definitely lacking in this respect. This error, which DAVENPORT did not make alone, plus the lack of a substantial series from the type locality (Lake Winnipeg), have contributed much toward the bewilderment surrounding the status of *C. ochracea.* It seems that an examination of the original description and of the number of familiar published figures should make it clear that to regard the Front Range population as *C. ochracea* is quite unacceptable. DAVENPORT theorizes that EDWARDS must have got his labels mixed and that the lone type of *C. ochracea* was actually from some other locality than Lake Winnipeg. A letter from Dr. J. H. MCDUNNOUGH expresses the belief that the type specimen of *C. ochracea* actually came from Lake Winnipeg and so was correctly labeled, but that it was atypical of the population of that area. In other words it was a freak in a colony of *C. inornata.* In view of all the speculation complicating this problem, Dr. MCDUNNOUGH'S opinion seems the most acceptable.

It has also been said that *C. ochracea* has occurred in California, but there is no authentic record of this and it is most doubtful. Any occurrence in Kansas is also very doubtful, so that statement should be discounted.

It may be revealing to review here EDWARDS' description of *C. ochracea* and to point out its major deviation from *C. phantasma.*

CŒNONYMPHA OCHRACEA — EDW.

Male. Upper side of a bright glossy ochre yellow without any spot or mark, except what is caused by the transparency of the wings; base of both wings dark grey; abdominal margin of the secondaries pale grey; fringes pale grey crossed by a dark line.

Under side of primaries same color as above, costal margin, apex and base greyish, near the apex a round, sometimes rounded oblong, black spot with white pupil and pale yellow iris; this is preceded by an abbreviated, pale yellow ray.

Secondaries LIGHT REDDISH-BROWN, grayish along the hind margin; abdominal margin and base dark grey; near the hind margin and parallel to it A SERIES OF SIX BLACK DOTS, SOMETIMES OBSOLETE, USUALLY WITH WHITE PUPIL AND BROAD YELLOW IRIS; near the base two irregular pale brown spots, and midway between the base and the hind margin a sinuous, interrupted ray of the same color, extending nearly across the wing.

Female like male.

The salient features that are to be emphasized in comparing *C. ochracea* with *C. phantasma* are here capitalized. A study of scores of specimens of *C. ochracea* makes it evident that EDWARDS must have meant that the black dots were sometimes obsolete but that the white pupil and the yellow iris persisted.

It here seems pertinent to examine some other phases of the *C. ochracea* complex, for instance, the name *Cœnonympha brenda* EDWARDS which has often been confused with *C. ochracea.* Without doubt, HOLLAND'S figures of *C. brenda* that appear in his revised edition of *The Butterfly Book* are *C. ochracea.* Judging from this conception BARNES and MCDUNNOUGH rightly have said, "*brenda* described from some of REAKIRT'S material ostensibly from Los Angeles, California, is a typical *ochracea.*" Dr. MCDUNNOUGH synonymizes *C. brenda* under *C. ochracea* in his 1938 *Check List.* In fact, no insect resembling HOLLAND'S figures of *C. brenda* has ever been recorded in or adjacent to the Los Angeles region. Unfortunately no type specimen of *C. brenda* can be found in the Edwards Collection which is at the Carnegie Museum. There are in the Strecker Collection in the Chicago Natural History Museum the supposed types of *C. brenda.* These specimens do not agree with the original description of that insect. They are remarkably similar to *C. ochracea.* On account of this error the identity of *C. brenda* has been obscured. It is unlikely that EDWARDS, being quite familiar with both of these races, should have confused them. *C. brenda* probably was from Los Angeles and so was rightly recorded. All evidence points to the fact that it is a form of *Cœnonympha california* Westwood & Hewitson which conforms to the description of *C. brenda.* This form of *C. california* is not uncommon in southern California. It is comparatively well spotted and has a rusty-white ground color. EDWARDS' description of *C. brenda* in substance embraces these characters and goes on to qualify further by stating that the under-side of primaries have "a faint, transverse, reddish line beyond the cell, commencing at subcostal, thence straight to upper median, after which it is tortuous and disappears near lower median. Secondaries have a similar line angular to end of cell thence tortuous to abdominal margin." These features do not agree with any specimens that have a likeness to *C. ochracea* or any other Utah material, but they do agree with a form of *C. california* that is found near Los Angeles and San Diego. *C. california* is a species that embraces many forms in a continuous cline of gradually changing character that extends the length of the state of California. Thus it seems that *C. brenda* is a form of *C. california* with the possibility that it may fall as a synonym.

Another member of the genus rather closely related to *C. phantasma* is *Cœnonympha benjamini* McDunnough. It will be noted in the description of *C. benjamini* that there is no mention made of basal spots on the under side of the secondaries, nor do any such spots normally occur. All available illustrations of *C. benjamini* show that these basal spots, which are a definite part of the pattern of *C. phantasma,* are entirely lacking in *C. benjamini.* In writing about *C. benjamini,* MCDUNNOUGH states, "Sometimes two or three light colored blotches appear sub-marginally on the under sides of the secondaries but this is atypical."

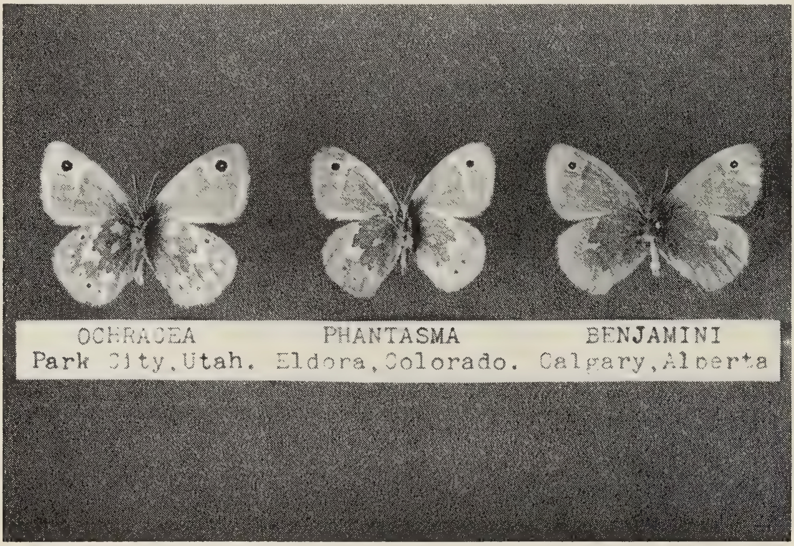
COMPARATIVE TABLE OF DISTINCTIVE CHARACTERS

Under sides of secondaries

Color: — *ochracea* light reddish-brown; *benjamini* greenish-gray; *phantasma* similar to *benjamini.*

Sub-marginal Ocelli: — *ochracea* well defined; *benjamini* none; *phantasma* reduced.

Basal Spots: — *ochracea* well defined; *benjamini* none; *phantasma* present.



Left: *Cœnonympha inornata ochracea* Edw. ♂, Park City, Utah, 4 July 1937, *leg.* W. N. BURDICK.

Center: *Cœnonympha inornata phantasma* Burdick, HOLOTYPE ♂, Eldora, Colorado, 21 June 1941, *leg.* D. EFF.

Right: *Cœnonympha inornata benjamini* McD. ♂, Calgary, Alberta, 4 July 1900, *leg.* F. WOLLEY DOD.

[All undersides. Photo by PAUL HOLLOWAY.]

The writer wishes to express appreciation for editorial comment by Dr. C. L. REMINGTON and for the loan of specimens by LLOYD M. MARTIN, Associate Curator of Entomology, Los Angeles County Museum.

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A PSEUDOSCORPION ON MOTHS

by ASHER E. TREAT

The collector who uses his hand lens or entomological microscope before spreading and boxing his specimens may encounter many an interesting and unexpected biological association. The example reported here shows that even insects collected years previously may yield surprises.

Because of their smallness and their retiring habits, the tiny arachnids of the order Pseudoscorpionida are seldom seen, though common and widely distributed. More than 1,000 species are known, the largest only about 8 millimeters long, and most very much smaller. All are predatory, feeding on mites and other small arthropods under stones, in mosses and leaf litter, in bark or rotting wood, or in heaps of organic debris. One species is found in old books and in clothes closets, where it preys upon psocids. Another lives on the salt beaches of the Mediterranean Sea. Several inhabit caves. The name pseudoscorpion reflects the resemblance of the body and appendages to those of true scorpions. The abdomen, like that of true scorpions, is clearly segmented, but it is not narrow or elongated in the posterior portion, and does not bear a sting.

Several species of pseudoscorpion are commonly found on the bodies of other animals, most often on Diptera, Coleoptera, and Hymenoptera, but occasionally on insects of other orders, and even on birds and small mammals. The association exemplifies phoresy or phagophily rather than parasitism. The arachnid does not attack or injure its bearer, but appears to be benefitted solely by being transported (phoresy) or, in some instances, by preying upon mites which are sharing the same "vehicle." The latter behavior is referred to as phagophily (BEIER, 1948). Though male pseudoscorpions are occasionally found in such situations, VAUCHON (1947, 1949) conjectures that it is the females which are most often phoretic. These, he believes, after the curious process of injecting their nutritive body fluids into their larval offspring, are in urgent need of food, and are ready to attach themselves to any animal that presents itself.

Records of pseudoscorpions on moths are exceedingly rare. BEIER (1930) refers to 4 adults of *Atemnus piger* (Simon, 1878) taken in October, 1929, from moths attracted to light at Guelt-es-Stel, south central Algeria. These were the first of this species collected since the original description. In 1932 BEIER described a new species, *ugandanus,* of the African genus *Stenowithius* from a male and 8 females found on an arctiid moth, *Spilosoma rattrayi* Hampson, taken in Kampala, Uganda, on 2 February 1930. BERLAND (1932), without giving details or references, credits one J. DE JOANNIS with the observation of a pseudoscorpion transported by a microlepidopteran.

A search for mites on pinned Lepidoptera in the collection of The American Museum of Natural History has brought to light two more instances of the association of pseudoscorpions with moths. One moth was a female *Acronycta g. grisea* Walker. The specimen bears three printed labels: an incorrect sex determination, "♂," a locality reading "Me." (Maine), and a third reading "Collection J. B. Smith." The second moth was a female *Acronycta ovata* Grote, labelled merely "Collection J. B. Smith." It does not seem possible to obtain precise locality data on either of these insects, and their collection dates can be fixed only as within the period of SMITH'S professional activity, roughly between 1880 and 1910. FORBES (1954) states that *A. grisea* flies in June and July, and gives its range as "from Hamilton Sound, Labrador, and northern localities in Ontario to Alberta . . . and south to central Maine and mountains of New Hampshire and New York." *A. ovata* is said to fly from May to July, ranging from "Massachusetts to Tennessee, Minnesota, Colorado and Texas," with "runty" specimens appearing from Manitoba and Nova Scotia.

On each of these moths a single male pseudoscorpion was found. In each instance the anterior parts of the arachnid were deeply buried among (but apparently not attached to) the scales covering the antero-ventral surface of the cervical and prothoracic regions. The only part of the arachnid that was visible in its undisturbed position on the moth was the abdomen. This was much flattened dorso-ventrally, presumably by dessication. The pincers were open, and extended forward so that a tip of each lay close to the base of the labial palpus on the corresponding side. The venter of the pseudoscorpion was in contact with the ventral side of the moth. No mites, psocids, dermestids, or other animals were found on these insects.

The pseudoscorpions were sent to Dr. C. CLAYTON HOFF of the University of New Mexico, who has tentatively identified them as an undescribed species of the genus *Apocheiridium* J. C. Chamberlin, 1924, a group not previously recorded from eastern United States.

Since the history of the host specimens is poorly known, the possibility must be considered that the arachnids became associated with them in the cabinet rather than in the field. Mites and psocids are found occasionally as scavengers in insect collections. It is conceivable that the pseudoscorpions might have boarded the pinned specimens in search of such prey, and were killed by fumigation or desiccation. No living mites or psocids have been seen in the collection of The American Museum of Natural History, but evidence of their former presence in tributary collections is often noted. However, the lack of such evidence in these specimens, together with the identical positions of the two arachnids on the insects, suggests true phoresy rather than predation upon scavengers.

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THE STATUS OF *KALMIA* AS A HOST PLANT OF *INCISALIA AUGUSTINUS* (LYCÆNIDÆ)

by J. B. Ziegler

A discussion of this topic formed part of the substance of a paper by the present author (1953) which appeared recently in this journal. At that time it was pointed out that the inclusion of *Kalmia* in the host plant list of *Incisalia augustinus* Westwood appeared to be based upon papers by John H. Cook, and the pertinent work of that author was summarized. To recapitulate briefly the evidence of Cook on this point, he had made the following observations: (1) the butterfly had been seen to oviposit on *Kalmia* (presumably in the laboratory); however, (2) larvæ were never discovered on this plant in nature; (3) it was impossible to rear the insect on *Kalmia* in the laboratory (larvæ which had been feeding normally on *Vaccinium* refused to eat *Kalmia*); and (4) the green larvæ would be quite conspicuous (and therefore liable to attack by predators) while feeding on the rosy *Kalmia* flowers, the most likely site of attack. On the other hand, Cook had no difficulty in demonstrating that *Vaccinium* spp. were authentic host plants of this butterfly according to the criteria mentioned in points 1, 2, and 3 above.

In an interesting recent paper, KNUDSEN (1955) added *Azalea calendulacea* Michx. to the host plant list of the lycænid butterfly, *Strymon liparops* Bdv. & Lec., already known to be widely polyphagous. He found larvæ feeding on the flame-colored azalea flowers, and carried them successfully through to pupation and emergence. In view of the apparent irrelevance to the survival of this butterfly of its exposed position while feeding on this host plant, he reasoned by analogy that *I. augustinus* might show a similar feeding habit on *Kalmia.* Since this would tend to invalidate point 4 mentioned above in the argument against *Kalmia* as a host plant for *I. augustinus,* he suggested that this plant should be retained on the list for this butterfly.

While we are in agreement with KNUDSEN with regard to the possible significance of his findings as they bear on the validity of point 4 in the argument outlined above, yet it should be emphasized that this point is a minor one in that argument. Considered in sum, COOK'S evidence speaks very strongly against *Kalmia* as a host plant for *I. augustinus.* It may be assumed that his observation of oviposition on this plant was an artifact due to the unnatural conditions of laboratory host plant screening experiments. One other point not mentioned in our earlier paper may be stressed at this time. *I. augustinus* is the earliest Hairstreak in the vicinity of Lakehurst, New Jersey. It ordinarily appears on the wing about the middle of April and the flight is about over by the middle of May or perhaps somewhat earlier. Therefore the peak density of hatching eggs must occur in late April or early May. At this time *Vaccinium* spp. and *Arctostaphylos uva-ursi* Spreng., authenticated host plants of *I. augustinus,* are in full bloom (early instar larvæ attack the flowers), while *Kalmia angustifolia* L. does not blossom in this locality until much later.

In conclusion, there seems to be little evidence for, and much against, *Kalmia* as a host plant of *I. augustinus.* As matters now stand, it does not deserve a place on the list.

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NEW NORTH CAROLINA ENTOMOLOGICAL SOCIETY

At a meeting held at Raleigh, N. C., on 17 November 1956, the North Carolina Entomological Society was organized, with membership open to all interested in entomology. Dr. C. F. SMITH (Head, Dept. of Entomology, N. C. State College, Raleigh) was elected President, and Mr. JAMES F. GREEN (N. C. State Dept. of Agriculture, Raleigh) Secretary-Treasurer.

R. R. MCELVARE, P. O. Box 386, Southern Pines, N. C., U. S. A.

AN ANNOTATED LIST OF SOUTHEASTERN WYOMING RHOPALOCERA

by GENE R. DEFOLIART

Wyoming is among the least known areas entomologically in the United States. The older distribution lists of Lepidoptera all too frequently included "Colorado and Montana" in the range of a given species with Wyoming conspicuous by its absence. Although an increasing amount of collecting by lepidopterists has been done in the State in recent years, the dearth of published information remains.

A complete list of the butterflies of the State has never been attempted. KLOTS (1930) recorded 78 species from Wyoming on the basis of collecting at Moose, Teton County, in the northwest and in the Medicine Bow Range of Albany County in the southeast. While not intended as a state list by its author, his paper remains the longest published list to date of Wyoming butterfly records.

KLOTS recorded 43 species from Albany County with some additional ones from nearby northern Colorado localities. Additional published records, mostly by KLOTS (1937, 1940) and NABOKOV (1953), bring the total to nearly 60 species previously reported as occurring in southeastern Wyoming. The purpose of the present paper is to report for the first time a great number of additional species occurring in the southeastern area, bringing the total to 127 species, many of which are recorded also for the first time from anywhere in Wyoming.

There are many species yet to be recorded from the southeastern area that should turn up with additional collecting. The fauna of the north and west differs markedly from that of the southeast. When Wyoming has been as thoroughly collected as some other states, it should boast a rich and varied butterfly fauna, possibly exceeded only by one or two other states.

PHYSIOGRAPHY AND CLIMATE

The writer has had opportunity to collect intensively in Albany and Platte Counties during the past 5 years and to a lesser extent in Carbon County. The location of the three counties is shown in Figure 1.

The area consists mainly of elevated plains broken by mountain ranges and river valleys. The Medicine Bow Range in southwestern Albany County and southeastern Carbon County has many square miles above timberline topped by Medicine Bow Peak at an elevation of 12,005 ft. The northern, most elevated part of the Medicine Bows is known as the Snowy Range and is frequently capped with snow even in midsummer. Snowy Range Pass (elev. 10,800 ft.) is traversed by a good hard-surfaced highway (State 130). In eastern Albany County, the Laramie Mountains occur as a foothill spur of the Medicine Bows, separated from the latter by the Laramie Plain. The Sierra Madre Mountains in Carbon County are separated from the Medicine Bows by the upper North Platte valley. The backbone of this range forms the Continental Divide with the highest point being Bridger Peak (elev. 11,007 ft.). Eastward from the Laramie Mountains, the plains are less elevated, the lowest point in the area being Guernsey located on the North Platte at an elevation of 4400 ft.

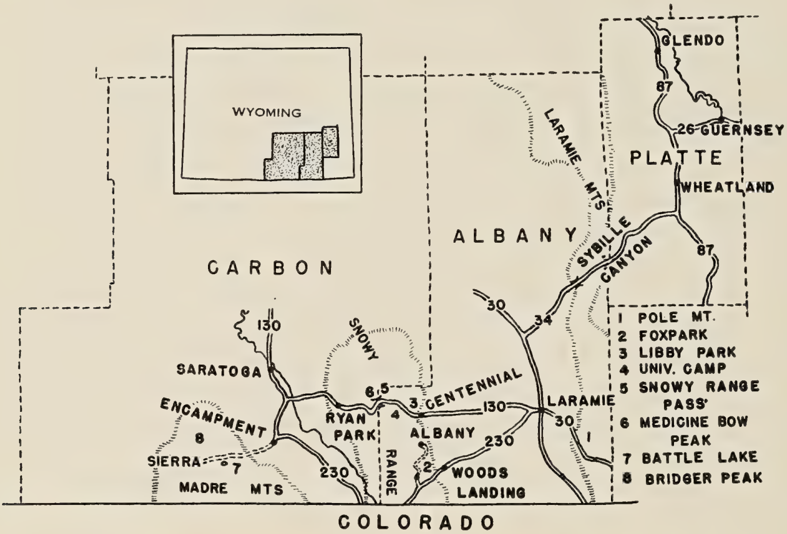

Fig. 1. Map of southeastern Wyoming. Inset shows the location of Albany, Carbon, and Platte Counties in relation to the rest of Wyoming.

Rainfall on the plains averages 11 to 15 inches. The mountains receive a great deal more moisture both as winter snows and heavy rains during the summer. The annual average temperature at representative points is 41.4°F. at Laramie, 33.2°F. at Foxpark, and 48.8°F. at Wheatland. Average annual precipitation for the three locations is 11.32, 17.84, and 13.70 inches respectively.

LIFE ZONES AND COLLECTING LOCALITIES

Features of the various collecting localities probably can best be ascertained by delimiting life zones as they occur in the three-county area. For detailed information on life zones in Wyoming, Cary (1917) should be consulted.

The **Upper Sonoran Zone** occurs along the eastern border of the State as an extension of the Great Plains to the east. Its upper limits are generally between 5,000 and 6,000 ft. and it includes a large part of central and eastern

Platte County. It is mainly open plain covered with a luxuriant growth of grasses and large groves of broad-leaved cottonwoods along the rivers and streams. Willows, Box Elder, Flowering Currant, and Wolfberry also occur along the streams, and shrubs common on dry flats and rocky slopes include Saltbush, Rabbit Brush, Sagebrush, Yucca, and others. Localities collected include:

Guernsey, Platte Co., elev. 4400 ft. Collecting mainly along east shore of Guernsey Reservoir. Upper Sonoran species predominate, but rocky buttes and hills support a scrubby growth of Rocky Mountain Juniper, Yellow Pine, and other Transition vegetation.

Wheatland, Platte Co., elev. 4700 ft. Collecting within a 10 to 15 mile radius on both irrigated and grass land.

The **Transition Zone** occurs approximately between 6,000 and 8,000 ft. elevation and is well marked only along its upper border where sage slopes give way to the aspen and coniferous forest belt. It occupies the remainder of Platte County and the sagebrush plains and high grassy plains of nearly all of Albany and Carbon Counties except the mountainous areas. Sagebrush, grasses, and Yellow Pine are characteristic types of vegetation along with Rocky Mountain and Creeping Junipers, Mountain Mahogany, Rocky Mountain Birch, Gooseberry, and many others. Collecting localities include:

Centennial, Albany Co., elev. 8100 ft. Collecting in sagebrush flats west of town.

Woods Landing, Albany Co., elev. 7500 ft. Collecting in canyons just below the forest.

Sybille Canyon, Albany Co. Collecting from Morton's Pass east along State Highway 34 at elevations of about 7500 ft. down to about 5500 ft.

Glendo, Platte Co., elev. 4700 ft. Collecting between Highway 87 and the North Platte River 5 to 15 miles south of town.

The **Canadian Zone** occurs extensively on the Medicine Bow Range and the Sierra Madre and Laramie Mountains approximately between 8,000 and 10,000 ft. It is characterized by forests of Aspen, Lodgepole Pine, Engelmann Spruce and Fir. Collecting localities include:

Albany and Foxpark, Albany Co., elev. approximately 8500 ft.

Illinois-Douglas Creek jct., elev. approximately 8,000 ft.

Lower Libby Park, Albany Co., elev. 8500 ft. Collecting along Highway 130 up to about 9,000 ft.

University of Wyoming Science Camp, Albany Co., elev. 9600 ft. Collecting in large meadows at upper edge of coniferous forest up to about 10,300 ft.

Pole Mountain, Albany Co., elev. 8500 ft. Most collecting at lower fringe of the forest.

Ryan Park, Carbon Co. Collecting along Highway 130 on western slope of Snowy Range at elevations of 8,000 to 9500 ft.

Sierra Madre Mountains, Carbon Co. Collecting mostly in Canadian Zone along gravel road from Encampment to beyond Battle Lake at elevations of 8,000 to 9,900 ft.

Collecting in **Hudsonian Zone** territory was confined to the area around Snowy Range Pass, Albany Co., elev. 10,800 ft., and at elevations up to about 11,500 ft. Lewis Lake, Towner Lake, and Lake Marie are nearby. The area is characterized by patches of stunted spruce and many small lakes. **Arctic-Alpine Zone** is restricted to the barren top of Snowy Range.

LIST OF SPECIES

Arrangement of families (and genera as nearly as possible) follows that of Klots (1951). With exceptions, arrangement and use of species names within genera primarily follows McDunnough (1938). The writer has taken all species previously reported for the area, with the exceptions of two migratory pierids, so previously published records are not repeated. Mr. F. M. Brown kindly volunteered the data from his collecting trips in the area, and his captures are designated (FMB). Flower preferences and other data are given for some of the species by Klots (1930), and additional recent information on nearly all of the species can be found in *Colorado Butterflies,* by Brown, Eff, and Rotger (1954).

SATYRIDÆ

1. *Cœnonympha tullia ochracea* Edwards. Albany Co.: nr. Eagle Mt. 7-2 to 4-51 (FMB); Garrett 7-1-51 (FMB); Illinois-Douglas Creek jct. 7-4-55; Libby Park 6-24-52; Pole Mt. 7-20-52, 6-19-54; Sybille Canyon 6-14-52, 6-12-54; U.W. Sci. Camp 7-5-54; Woods Landing 5-30-54, 6-11-54, 6-12-55. Carbon Co.: Ryan Park 7-1-55; Sierra Madre Mts. 6-26-54. Widespread and common throughout the region with greatest abundance in Transition and Canadian Zones.

2. *Neominois ridingsii* Edwards. Platte Co.: Glendo 6-18-53; Wheatland 6-13-52. Quite local.

3. *Cercyonis pegala olympus* Edwards. Platte Co.: Glendo 7-2-52; Wheatland 7-20-51, 7-10-52, 7-14-53, 7-16-53. Frequents grassy hillsides and meadows, especially near streams.

4. *Cercyonis meadii* Edwards. Platte Co.: Glendo 8-14-52, 8-20-52, 9-3-52, 9-9-53. Very local and not common even when found.

5. *Cercyonis œtus charon* Edwards. Albany Co.: Centennial 6-30-52; Pole Mt. 7-30-51, 7-13-52, 7-27-52, 7-28-54, 8-8-54, 7-30-55, 8-15-55; Woods Landing 7-28-54. Carbon Co.: Ryan Park 7-29-55. Platte Co.: Glendo 7-2-52. This is undoubtedly the most abundant satyrid in the region and, next to *C. ochracea,* the most widely distributed.

6. *Œneis chryxus* Doubleday. Albany Co.: Albany 6-20-54; Libby Park 6-24-52, 6-26-54; Pole Mt. 6-19-54; U.W. Sci. Camp 6-30-52, 7-5-54; Snowy Range Pass 6-30-52. Carbon Co.: Sierra Madre Mts. 6-26-54. *O. chryxus* seems to occur in the area only in even-numbered years.

7. *Œneis uhleri* Reakirt. Albany Co.: Albany 6-20-54; nr. Eagle Mt. 7-2 to 4-51 (FMB); Illinois-Douglas Creek jct. 7-4-55; Palmer Canyon 7-1-51 (FMB); Woods Landing 6-14-53, 6-20-53, 5-30-54, 6-11-54, 6-12-55, 6-18-55. Atypical, but not sufficiently different to warrant subspecific recognition according to Brown (1953) who figures a male and female from the Laramie Mountains.

8. *Erebia epipsodea* Butler. Albany Co.: Centennial 6-30-52; nr. Eagle Mt. 7-2 to 4-51 (FMB); Foxpark 7-4-55; Illinois-Douglas Creek jct. 7-4-55; Lake Marie 7-25-53

(FMB); Pole Mt. 6-28-53, 7-11-53, 6-19-54; Snowy Range Pass 7-15-52, 7-20-55; Sybille Canyon 6-12-54; Towner Lake 7-25-53; Upper Nash Fork 7-24-53 (FMB); U.W. Sci. Camp 6-30-52, 7-13-53, 7-5-54. Carbon Co.: Ryan Park 6-26-54, 7-1-55.

DANAIDÆ

9. *Danaus gilippus strigosus* Bates. Albany Co.: Albany 6-20-54; a single worn specimen. Another, in better condition, was seen on Pole Mt. in August, 1953.

10. *Danaus plexippus* Linné. Platte Co.: Wheatland 7-14-53. Only 2 to 3 dozen specimens seen in most years.

NYMPHALIDÆ

11. *Euptoieta claudia* Cramer. Albany Co.: Foxpark 7-4-55; Pole Mt. 8-1-53. Carbon Co.: Sierra Madre Mts. 8-17-54. Platte Co.: Wheatland 8-12-53, 8-18-53. Frequently becomes common on the plains late in the summer.

12. *Speyeria cybele charlottii* Barnes. Carbon Co.: Sierra Madre Mts. 8-2-55. 8-28-55. These dates are late; only females were taken.

13. *Speyeria aphrodite ethne* Hemming. Albany Co.: Pole Mt. 7-30-51, 7-13-52, 8-1-53, 8-6-53, 8-7-53, 7-30-55. Platte Co.: Wheatland 7-2-53; Glendo 8-12-53.

14. *Speyeria idalia* Drury. Platte Co.: Wheatland 7-7-55. The specimen was netted by Dr. W. D. FRONK while collecting with the author.

15. *Speyeria edwardsii* Reakirt. Albany Co.: nr. Eagle Mt. 7-2 to 4-51 (FMB); Lewis Lake 7-23-51 (FMB); Pole Mt. 7-13-52, 8-23-53, 6-19-54; Sybille Canyon 6-11-52, 6-14-52. Platte Co.: Wheatland 6-13-52, 6-24-53, 6-30-55.

16. *Speyeria coronis halcyone* Edwards. Albany Co.: Pole Mt. 7-13-52, 7-20-52, 8-1-53, 8-6-53, 8-23-53, 7-30-55; Sybille Canyon 6-14-52, 7-9-53. Carbon Co.: Ryan Park 7-29-55; Sierra Madre Mts. 8-17-54. Platte Co.: Guernsey 7-20-51, 6-18-52, 7-16-52; Wheatland 6-24-53, 7-2-53, 7-7-55. These show much green and according to PAUL GREY (personal communication) are transitional toward *snyderi* Skinner, the Utah and western Wyoming subspecies. It is a common species in this area.

17. *Speyeria zerene platina* Skinner. Albany Co.: Pole Mt. 7-30-51, 7-20-52, 7-27-52, 8-17-52, 8-20-52, 8-1-53, 8-7-53, 8-23-53. Grey provisionally referred these to *zerene,* but stated that they are not quite typical of any named subspecies, running to *sinope* dos Passos & Grey, *platina,* and *garretti* Gunder. They are somewhat difficult to separate from the local *Speyeria coronis.*

18. *Speyeria callippe meadii* Edwards. Albany Co.: Albany 6-20-54; Pole Mt. 8-11-51, 7-13-52, 7-11-53; Sybille Canyon 6-13-52, 6-14-52, 6-27-53, 6-12-54. Carbon Co.: Ryan Park 6-26-54; Sierra Madre Mts. 6-26-54. This insect, lighter than true *meadii,* abounds in some years in Sybille Canyon.

19. *Speyeria egleis secreta* dos Passos & Grey. Carbon Co.: Sierra Madre Mts. 8-17-54, 8-2-55. Abundant on the latter date.

20. *Speyeria atlantis hesperis* Edwards. Albany Co.: Libby Park 6-30-52; Pole Mt. 7-30-51, 8-11-51, 7-13-52, 7-20-52, 8-1-53, 8-6-53, 8-7-53, 8-23-53, 8-8-54, 7-30-55, 8-15-55; Woods Landing 7-21-52. Carbon Co.: Ryan Park 7-29-55; Sierra Madre Mts. 6-26-54, 8-2-55. Apparently never descends much below 8,000 ft.

21. *Speyeria hydaspe sakuntala* Skinner. Carbon Co.: Sierra Madre Mts. 8-17-54, 8-2-55.

22. *Speyeria mormonia eurynome* Edwards. Albany Co.: Albany 6-20-54; Lewis Lake 7-23-53 (FMB); Pole Mt. 7-22-51, 7-30-51, 8-6-53, 8-7-53, 8-8-54, 7-30-55; Snowy Range Pass 7-5-54, 7-31-54; Towner Lake 7-25-53; U.W. Sci. Camp 8-15-53. Carbon Co.: Ryan Park 6-26-54; Sierra Madre Mts. 6-26-54, 8-17-54, 8-2-55. *S. eurynome* ranges higher than any of the other local *Speyeria,* and, with *Plebeius glandon rustica* and *Colias eurytheme,* is one of the last species to disappear from the high mountains in September. Like *S. hesperis,* it is never found at lower elevations.

23. *Boloria selene tollandensis* Barnes & Benjamin. Albany Co.: Foxpark 6-29-52, 7-15-52, 6-20-54, 7-2-54, 7-4-55; Illinois-Douglas Creek jct. 7-4-55. Carbon Co.: Ryan Park 6-26-54. Habits and habitats of this and the following species are locally more or less as reported by BROWN (1954) for Colorado *Boloria.*

24. *Boloria eunomia laddi* Klots. Albany Co.: Lewis Lake 7-25-53; Snowy Range Pass 7-31-54, 7-17-55, 7-20-55, 7-29-55; Upper Nash Fork 7-24-53 (FMB). Lewis Lake is the type locality of the subspecies. It was described by KLOTS (1940).

25. *Boloria titania helena* Edwards. Albany Co.: Foxpark 7-2-54, 8-1-54; Lake Marie 7-25-53 (FMB), 8-8-53; Lewis Lake 7-23-53 (FMB); Snowy Range Pass 7-15-52, 6-26-54, 7-20-55; U.W. Sci. Camp 8-15-53. Carbon Co.: Sierra Madre Mts. 8-2-55.

26. *Boloria freija browni* Higgins. Albany Co.: Foxpark 6-12-55, 6-19-55; Illinois-Douglas Creek jct. 5-15-54, 5-15-55; Lewis Lake 7-23-53 (FMB); Snowy Range Pass 7-15-52, 6-26-54; Upper Nash Fork 7-24-53 (FMB); U.W. Sci. Camp 7-3-53. A very early appearing species.

27. *Boloria toddi* Holland. Albany Co.: nr. Eagle Mt. 7-2 to 4-51 (FMB); Foxpark 6-20-54, 7-2-54; Illinois-Douglas Creek jct. 7-4-55; Pole Mt. 7-11-53. Carbon Co.: Ryan Park 6-26-54, 7-1-55. This insect occurs abundantly at Ryan Park.

28. *Boloria frigga sagata* Barnes & Benjamin Albany Co.: Albany 6-20-54, 6-19-55, 7-4-55; Foxpark 6-29-52, 6-20-54. Occurs in several bogs in the Albany-Foxpark area but is always scarce.

29. *Euphydryas anicia eurytion* Mead. Albany Co.: Centennial 6-30-52, 7-3-53, 7-5-54; Libby Park 6-24-52; Pole Mt. 6-13-53, 7-11-53, 6-13-54, 6-19-54; Snowy Range Pass 6-30-52, 7-15-52, 6-26-54, 7-5-54; Sybille Canyon 6-21-53, 6-12-54, 5-29-55; U.W. Sci. Camp 6-30-52, 7-13-53, 7-5-54; Woods Landing 6-14-53, 6-11-54. Long series from the same spot are extremely variable, and individual specimens resemble not only *eurytion,* but also *capella* and occassionally *bernadetta.* Material from the following localities is best referred to race *bernadetta* Leussler: Albany Co.: nr. Eagle Mt. 7-2 to 4-51 (FMB). Carbon Co.: Sierra Madre Mts. 6-26-54, 8-2-55.

30. *Euphydryas editha* Boisduval. KLOTS (1930) reported a subspecies of this from the University Science Camp. He determined the species by genitalic examination, but was unable to distinguish females from those of *E. anicia eurytion* with which they were flying. He did not take *E. editha* at lower elevations. Probably, some of the records from higher elevations given above under *E. anicia eurytion* actually are of this species.

31. *Melitæa pola arachne* Edwards. Albany Co.: Woods Landing 7-28-54. Platte Co.: Glendo 8-14-52, 8-20-52, 6-23-53.

32. *Melitæa palla calydon* Mead. Albany Co.: nr. Eagle Mt. 7-2 to 4-51 (FMB). Carbon Co.: Sierra Madre Mts. 8-2-55.

33. *Melitæa gorgone carlota* Reakirt. Albany Co.: Sybille Canyon 6-12-54. Platte Co.: Glendo 7-16-52.

34. *Melitæa nycteis drusius* Edwards. Albany Co.: Sybille Canyon 6-21-53, 6-12-54, 6-19-55.

35. *Phyciodes campestris camillus* Edwards. Albany Co.: Foxpark 8-1-54; Illinois-Douglas Creek jct. 7-4-55; Pole Mt. 9-9-52, 6-28-53, 7-11-53, 8-7-53, 8-23-53, 9-5-53; Sybille Canyon 6-21-53, 6-27-53; U.W. Sci. Camp 8-15-53. Carbon Co.: Ryan Park 7-9-55.

36. *Phyciodes tharos* Drury. Albany Co.: Pole Mt. 7-11-53; Sybille Canyon 6-27-53; Woods Landing 7-21-52. Platte Co.: Wheatland 8-5-53.

37. *Phyciodes mylitta* Edwards. Albany Co.: Sybille Canyon 6-12-54. Platte Co.: Guernsey 6-18-52. Race *barnesi* Skinner; Carbon Co.: Sierra Madre Mts. 8-2-55. The reader is referred to BROWN'S (1955) discussion of the status and spotted distribution of typical *P. mylitta* and *P. mylitta barnesi.* Typical *P. mylitta* is Californian and ranges eastward; *P. mylitta barnesi* was described from Glenwood Springs, Colorado. I have taken *barnesi* in the Sierra Madre and at Lander which is about 150 miles northwest. NABOKOV (1953) reported it as flying on sandy ground on the parched plain at less than 7,000 ft. altitude between Saratoga and Encampment just east of the Sierra Madres. Sybille Canyon and Guernsey, where *mylitta*-like specimens have been taken, are 75 and 125 miles, respectively, northeast of Saratoga. The latter three localities are similar, except that Guernsey is lower.

38. *Polygonia satyrus* Edwards. Albany Co.: Lewis Lake 7-23-53 (FMB); Pole Mt. 7-27-52, 8-17-52, 9-5-53. Carbon Co.: 20 mi. SE of Encampment 5-8-54. Form *marsyas* Edwards. Pole Mt. 7-27-52.

39. *Polygonia hylas* Edwards. Albany Co.: Libby Park 8-30-53; Pole Mt. 9-5-53. Carbon Co.: Sierra Madre Mts. 8-17-54, 5-20-55.

40. *Polygonia zephyrus* Edwards. Albany Co.: nr. Eagle Mt. 7-2 to 4-51 (FMB); Libby Park 8-30-53; Palmer Canyon 7-1-51 (FMB); Pole Mt. 7-27-52, 9-5-53, 9-7-53; U.W. Sci. Camp 8-15-53. Carbon Co.: Sierra Madre Mts. 8-17-54.

41. *Nymphalis californica* Boisduval. Albany Co.: Pole Mt. 8-17-52. There was a great influx of this species in 1952. It has not been seen since then.

42. *Nymphalis milberti subpallida* Cockerell. Albany Co.: nr. Eagle Mt. 7-2 to 4-51 (FMB); Lewis Lake 7-23-53 (FMB); Libby Park 6-30-52; Pole Mt. 8-1-53; Snowy Range Pass 7-15-52; Sybille Canyon 6-27-53; Towner Lake 7-25-53; U.W. Sci. Camp 8-8-53. Carbon Co.: Sierra Madre Mts. 8-17-54.

43. *Nymphalis antiopa* Linné. Albany Co.: nr. Eagle Mt. 7-2 to 4-51 (FMB); Palmer Canyon 7-1-51 (FMB); Pole Mt. 7-27-52, 9-7-53. Carbon Co.: 20 mi. SE of Encampment 5-8-54.

44. *Vanessa atalanta* Linné. Albany Co.: Palmer Canyon 7-1-51 (FMB); Pole Mt. 8-25-51, 8-17-52. Platte Co.: Wheatland 6-25-52.

45. *Vanessa virginiensis* Drury. Albany Co.: Pole Mt. 9-5-53. Rare.

46. *Vanessa cardui* Linné. Albany Co.: Centennial 5-25-52; Palmer Canyon 7-1-51 (FMB); Pole Mt. 8-15-55; Woods Landing 7-21-52. Platte Co.: Wheatland 9-15-53. Abundant everywhere in 1952.

47. *Vanessa carye* Hübner. Carbon Co.: Sierra Madre Mts. 8-17-54. One specimen only.

48. *Precis lavinia* Cramer. Platte Co.: Wheatland 7-7-55. One specimen.

49. *Limenitis weidemeyerii* Edwards. Albany Co.: Lewis Lake 7-23-53 (FMB); Pole Mt. 7-13-52, 7-11-53, 7-30-55. Carbon Co.: Sierra Madre Mts. 8-2-55. Platte Co.: Guernsey 6-18-52.

50. *Limenitis archippus* Cramer. Platte Co.: Wheatland 8-11-53. Not common. I have found it only in the N. Platte valley.

LYCÆNIDÆ

51. *Strymon melinus humuli* Harris. Platte Co.: Glendo 8-14-52; Guernsey 5-18-54. The specimens are between *humuli* and *atrofasciata,* but closer to the former, according to BROWN who examined them. It is very scarce. The same can be said more or less of all the hairstreaks.

52. *Strymon titus* Fabricius. Albany Co.: Woods Landing 7-28-54, 8-1-54. Carbon Co.: Sierra Madre Mts. 8-15-54, 8-17-54, 8-2-55.

53. *Strymon californica* Edwards. Albany Co.: Woods Landing 7-21-52, 7-28-54.

54. *Strymon sæpium* Boisduval. Albany Co.: Woods Landing 7-28-54, 8-1-54. Carbon Co.: Sierra Madre Mts. 8-15-54, 8-17-54.

55. *Callipsyche behrii crossi* Field. Albany Co.: Sybille Canyon 7-9-53; Woods Landing 7-21-52, 7-28-54, 8-1-54. Carbon Co.: Sierra Madre Mts. 8-17-54, 8-2-55.

56. *Satyrium fuliginosa* Edwards Albany Co.: Sybille Canyon 6-27-53. Carbon Co.: Sierra Madre Mts. 8-2-55.

57. *Mitoura spinetorum* Hewitson. Albany Co.: Albany 6-20-54, 7-4-55; Pole Mt. 6-28-53, 7-11-53, 6-19-54. Widespread and abundant in Canadian Zone.

58. *Mitoura siva* Edwards. Platte Co.: Guernsey 6-18-52, 7-9-53, 5-18-54, 5-11-55, 6-21-55. Extremely local.

59. *Callophrys apama homoperplexa* Barnes & Benjamin. Albany Co.: Centennial 7-3-53; Pole Mt. 6-28-53. Most specimens have the white discal line on the underside of the wings reduced to a faint white spot in the Cu_1-Cu_2 interspace.

60. *Callophrys sheridani* Edwards. Albany Co.: Centennial 5-25-52. Carbon Co.: 20 mi. SE of Encampment 5-8-54. This is one of the earliest appearing butterflies of the area.

61. *Incisalia augustinus* Westwood. Albany Co.: Centennial 5-25-52; Woods Landing 6-4-52, 6-14-53, 5-14-54, 5-30-54.

62. *Incisalia mossii schryveri* Cross. Carbon Co.: 20 mi. SE of Encampment 5-8-54. Underside of hindwing more dull than in typical *schryveri.*

63. *Incisalia polios* Cook & Watson. Carbon Co.: 20 mi. SE of Encampment 5-8-54.

64. *Incisalia eryphon* Boisduval. Albany Co.: nr. Eagle Mt. 7-2 to 4-51 (FMB); Foxpark 6-19-55; Palmer Canyon 7-1-51 (FMB); Pole Mt. 6-28-53; Woods Landing 6-1-52, 6-14-53, 6-11-54. Carbon Co.: Ryan Park 7-1-55. Platte Co.: Guernsey 5-18-54.

65. *Lycæna heteronea* Boisduval. Albany Co.: Libby Park 8-30-53; Pole Mt. 7-13-52, 7-27-52, 8-7-53, 8-15-55; Woods Landing 7-21-52, 7-28-54. Carbon Co.: Sierra Madre Mts. 8-17-54, 8-2-55.

66. *Lycæna thoe* Guérin. Platte Co.: Wheatland 8-28-53. Only one colony found so far.

67. *Lycæna xanthoides dione* Scudder. Platte Co.: Wheatland 7-14-53. One colony only.

68. *Lycæna rubidus sirius* Edwards. Albany Co.: Centennial 8-15-53; Pole Mt. 8-11-51, 8-1-53, 8-7-53, 8-23-53, 8-15-55. Platte Co.: Glendo 7-2-52, 7-2-53, 7-9-53; Wheatland 6-25-52. Widespread.

69. *Lycæna nivalis browni* Field. Albany Co.: Centennial 7-3-53; nr. Eagle Mt. 7-2 to 4-51 (FMB); Lake Marie 7-25-53 (FMB); Pole Mt. 7-11-53; Woods Landing 6-29-52. Carbon Co.: Sierra Madre Mts. 8-2-55. Not common.

70. *Lycæna helloides* Boisduval. Albany Co.: Foxpark 8-1-54; Pole Mt. 9-9-52, 7-11-53, 9-5-53; U.W. Sci. Camp 8-15-53; Woods Landing 6-29-52, 7-28-54. Carbon Co.: Sierra Madre Mts. 8-17-54, 8-2-55. Platte Co.: Wheatland 7-29-53. A large percentage of specimens are referable to form "florus".

71. *Hemiargus isolus* Reakirt. Platte Co.: Wheatland 7-29-53, 7-28-55. One specimen taken in an irrigated area, the other on sage flats.

72. *Everes amyntula* Boisduval. Albany Co.: nr. Eagle Mt. 7-2 to 4-51 (FMB); Sybille Canyon 6-27-53.

73. *Lycæides melissa* Edwards. Albany Co.: nr. Eagle Mt. 7-2 to 4-51 (FMB); Palmer Canyon 7-1-51 (FMB); Pole Mt. 9-9-52, 9-5-53; Sybille Canyon 6-12-54; Woods Landing 9-2-52, 6-11-54. Platte Co.: Guernsey 5-28-52; Wheatland 5-30-52.

74. *Plebeius glandon rustica* Edwards. Albany Co.: Albany 6-20-54; Foxpark 7-4-55; Illinois-Douglas Creek jct. 7-4-55; Lake Marie 7-25-53 (FMB); Lewis Lake 7-23-53 (FMB), 7-25-53; Pole Mt. 6-19-54; Snowy Range Pass 7-5-54, 7-17-55; Towner Lake 7-25-53; U.W. Sci. Camp 7-13-53, 8-8-53, 8-15-53, 8-29-53, 7-5-54; Upper Nash Fork 7-24-53 (FMB). Carbon Co.: Sierra Madre Mts. 6-26-54.

75. *Plebeius sæpiolus* Boisduval. Albany Co.: nr. Eagle Mt. 7-2 to 4-51 (FMB); Lewis Lake 7-2-53 (FMB), 7-25-53; Pole Mt. 7-11-53, 6-19-54, 6-26-55; Snowy Range Pass 6-30-52, 7-5-54, 7-3-55; Sybille Canyon 6-27-53, 6-12-54; Towner Lake 7-25-53; U.W. Sci. Camp 7-3-53, 7-13-53, 8-8-53, 8-15-53, 7-5-54; Upper Nash Fork 7-24-53 (FMB). Carbon Co.: Sierra Madre Mts. 6-26-54. Common and widespread.

76. *Plebeius icarioides lycea* Edwards. Albany Co.: nr. Eagle Mt. 7-2 to 4-51 (FMB); Pole Mt. 6-14-52, 6-19-54; Sybille Canyon 6-27-53, 6-12-54; U.W. Sci. Camp 6-30-52, 7-13-53, 7-5-54. Carbon Co.: Ryan Park 7-9-55.

77. *Plebeius shasta* Edwards. Albany Co.: Sybille Canyon 6-27-53. This little Blue was not known from Wyoming until recently. Now it has been found at Saratoga in the upper North Platte valley and at Dubois in the northwest by NABOKOV (1953) and in the Bighorn Mountains by F. M. BROWN (personal communication, 1953) as well as at the above location in the Laramie Mountains.

78. *Plebeius acmon lutzi* dos Passos. Albany Co.: Centennial 7-3-53; nr. Eagle Mt. 7-2 to 4-51 (FMB).

79. *Philotes enoptes ancilla* Barnes & McDunnough. Albany Co.: Centennial 7-3-53, 7-5-54; Palmer Canyon 7-1-51 (FMB); Pole Mt. 6-28-53; Sybille Canyon 6-27-53, 6-12-54. Platte Co.: Wheatland 8-18-55.

80. *Phædrotes piasus daunia* Edwards. Albany Co.: Sybille Canyon 6-12-54. Except for one specimen, I have not taken the species in Wyoming east of Lander which is 175 miles west of the above locality.

81. *Glaucopsyche lygdamus oro* Scudder. Albany Co.: nr. Eagle Mt. 7-2 to 4-51 (FMB); Foxpark 7-4-55; Illinois-Douglas Creek jct. 7-4-55; Sybille Canyon 5-29-55;

Woods Landing 6-1-52, 6-8-52, 6-14-53, 5-14-54, 6-18-55. Carbon Co.: Ryan Park 6-26-54, 7-1-55, 7-9-55; Sierra Madre Mts. 5-20-55, 6-16-55. Platte Co.: Guernsey 5-18-54.

82. *Lycænopsis argiolus pseudargiolus* Boisduval & Leconte. Albany Co.: Sybille Canyon 6-14-52, 6-19-55; Woods Landing 6-14-53. Carbon Co.: Sierra Madre Mts. 6-16-55.

PAPILIONIDÆ

83. *Papilio polyxenes* Fabricius. Albany Co.: Sybille Canyon 6-14-52. Adults are scarce in June, more common in August.

84. *Papilio brucei* Edwards. Albany Co.: Centennial 7-13-54; Pole Mt. 6-19-54; Sybille Canyon 6-27-53. Scarce.

85. *Papilio indra* Reakirt. Albany Co.: Sybille Canyon 6-21-53, 6-23-53, 6-25-53, 6-27-53. Platte Co.: Guernsey 5-18-54. A Transition Zone species.

86. *Papilio rutulus* Lucas. Albany Co.: Albany 7-4-55; nr. Eagle Mt. 7-2 to 4-51 (FMB); Illinois-Douglas Creek jct. 7-4-55; Palmer Canyon 7-1-51 (FMB); Pole Mt. 6-28-53, 7-11-53, 6-19-54; Sybille Canyon 6-27-53; Woods Landing 6-14-53, 6-26-53, 6-18-55. Carbon Co.: Ryan Park 6-26-54.

87. *Papilio multicaudatus* Kirby. Albany Co.: Albany 7-4-55; Laramie 7-2-53; Sybille Canyon 6-21-53, 6-27-53. Transition Zone species.

88. *Papilio eurymedon* Lucas. Albany Co.: Illinois-Douglas Creek jct. 7-4-55. Carbon Co.: Ryan Park 6-26-54.

89. *Parnassius smintheus sayii* Edwards. Albany Co.: nr. Eagle Mt. 7-2 to 4-51 (FMB); Garrett 7-1-51 (FMB); Illinois-Douglas Creek jct. 7-4-55; Lewis Lake 7-23-53 (FMB); Pole Mt. 7-15-51, 7-22-51, 7-30-51, 8-25-51, 7-30-55, 8-15-55; Snowy Range Pass 7-3-55, 7-17-55; Tie Siding 8-12-51. Carbon Co.: Sierra Madre Mts. 8-17-54, 8-2-55.

PIERIDÆ

90. *Anthocaris sara julia* Edwards. Albany Co.: Foxpark 6-19-55; Libby Park 6-24-52; Pole Mt. 6-13-53, 6-19-54; Woods Landing 6-29-52, 6-14-53. Carbon Co.: Sierra Madre Mts. 6-16-55.

91. *Euchloe ausonides coloradensis* Hy. Edwards. Albany Co.: Albany 7-4-55; nr. Eagle Mt. 7-2 to 4-51 (FMB); Foxpark 7-4-55; Illinois-Douglas Creek jct. 7-4-55; Libby Park 6-24-52; Palmer Canyon 7-1-51 (FMB); Pole Mt. 6-28-53; Sybille Canyon 5-18-54; Woods Landing 5-26-52, 6-4-52, 6-29-52, 6-18-55. Carbon Co.: Ryan Park 7-1-55, 7-9-55; 20 mi. SE of Encampment 5-8-54.

92. *Colias meadii* Edwards. Albany Co.: Lewis Lake 7-23-53 (FMB), 7-25-53; Pole Mt. 7-30-55; Snowy Range Pass 6-30-52, 7-13-53, 7-5-54, 7-17-55, 7-20-55, 7-29-55; Towner Lake 7-25-53. Restricted to Hudsonian Zone. It was surprising to turn up the specimen on Pole Mt. at 8,000 ft. elevation and 50 miles across the plains from its normal habitat.

93. *Colias eurytheme* Boisduval. F. "amphidusa". Albany Co.: Albany 6-20-54; Pole Mt. 9-9-52, 8-1-53, 8-6-53, 9-5-53; Sybille Canyon 6-27-53. Platte Co.: Wheatland 8-4-53. Female f. "alba" Platte Co.: Wheatland 7-29-53, 8-5-53. F. "ariadne" Albany Co.: Pole Mt. 8-7-53. Platte Co.: Wheatland 8-4-53, 8-5-53. F. "eriphyle" Albany Co.: Centennial 6-20-53, 8-29-53; nr. Eagle Mt. 7-2 to 4-51 (FMB); Pole Mt. 9-9-52, 6-13-53, 8-5-53, 8-23-53, 9-5-53, 8-15-55; Sybille Canyon 6-27-53; U.W. Sci. Camp 8-30-53; Woods Landing 7-21-52. Platte Co.: Chugwater 5-28-52; Glendo 7-2-52; Guernsey 5-28-52, 7-9-53. "Eriphyle" is the most common form in the area.

94. *Colias alexandra* Edwards. Albany Co.: Illinois-Douglas Creek jct. 7-4-55; Libby Park 6-24-52; Palmer Canyon 7-1-51 (FMB); Pole Mt. 7-30-51, 7-8-52, 7-13-52, 7-30-55; Woods Landing 7-28-54. F. "hatui" Pole Mt. 7-13-52.

95. *Colias scudderii* Reakirt. Albany Co.: Illinois-Douglas Creek jct. 7-4-55; Pole Mt. 7-30-55; Snowy Range Pass 8-15-53, 7-31-54; U.W. Sci. Camp 7-13-53, 8-15-53. Carbon Co.: Ryan Park 7-9-55.

96. *Colias cæsonia* Stoll. Platte Co.: Wheatland 7-10-52. Several specimens were seen on the above date in an alfalfa field, one of which was captured. That is the only time I have encountered it.

97. *Phœbis sennæ eubule* Linné. No specimens taken, but one was seen in Sybille Canyon, and NABOKOV (1953) saw one near Battle Lake in Carbon County.

98. *Eurema mexicana* Boisduval. Reportedly seen by NABOKOV (1953) between Cheyenne and Laramie.

99. *Nathalis iole* Boisduval. Albany Co.: Centennial 7-13-54. Platte Co.: Guernsey 7-16-52; Wheatland 7-7-55, 8-9-55, 8-18-55. Usually not common and only occasional individual specimens usually seen, but on August 2, 1955, more than 40 were observed along a 10 mile stretch of road west of Wheatland.

100. *Pieris sisymbrii* Boisduval. Albany Co.: Centennial 5-25-52; Sybille Canyon 5-18-54; Woods Landing 6-1-52, 6-4-52. Carbon Co.: 20 mi. SE of Encampment 5-8-54. Platte Co.: Guernsey 5-18-54. An early-appearing species frequently found flying with *E. ausonides coloradensis* from which it is difficult to distinguish on the wing.

101. *Pieris occidentalis* Reakirt. Albany Co.: Lewis Lake 7-23-53 (FMB), 7-25-53; Snowy Range Pass 8-8-53, 7-5-54. Carbon Co.: 20 mi. SE of Encampment 5-8-54.

102. *Pieris rapæ* Linné. Albany Co.: Sybille Canyon 7-9-53. Common.

103. *Pieris protodice* Bdv. & Lec. Platte Co.: Glendo 7-2-52, 7-16-52; Wheatland 8-5-53.

104. *Pieris napi macdunnoughii* Remington. Albany Co.: Lake Marie 7-25-53 (FMB); Lewis Lake 7-25-53; Libby Park 5-25-52, 6-24-52; Upper Nash Fork 7-24-53 (FMB); Woods Landing 6-14-53. Carbon Co.: Ryan Park 6-26-54; Sierra Madre Mts. 8-2-55.

HESPERIIDÆ

105. *Epargyreus clarus* Cramer. Platte Co.: Guernsey 6-23-53.

106. *Pyrgus centaureæ loki* Evans. Albany Co.: Snowy Range Pass 7-5-54.

107. *Pyrgus ruralis* Boisduval. Albany Co.: Woods Landing 6-14-53.

108. *Pyrgus communis* Grote. Albany Co.: Pole Mt. 9-5-53; Platte Co.: Glendo 8-12-53; Wheatland 8-18-55.

109. *Pholisora catullus* Fabricius. Platte Co.: Wheatland 7-28-53.

110. *Erynnis icelus* Scudder & Burgess. Albany Co.: Albany 7-4-55; Pole Mt. 6-13-54; Woods Landing 6-18-55.

111. *Erynnis persius frederickii* H. A. Freeman. Albany Co.: Albany 6-20-54; Centennial 7-5-54; Pole Mt. 6-19-54. Carbon Co.: Ryan Park 6-26-54.

112. *Butleria pirus* Edwards. Albany Co.: Pole Mt. 8-15-55.

113. *Oarisma garita* Reakirt. Albany Co.: Centennial 7-5-54; Pole Mt. 7-30-55; Sybille Canyon 6-21-53, 6-27-53.

114. *Yvretta rhesus* Edwards. Platte Co.: Guernsey 5-18-54.

115. *Yvretta simius* Edwards. Platte Co.: Wheatland 6-17-53, 6-30-55.

116. *Hesperia uncas* Edwards. Albany Co.: Laramie 6-?-54. Platte Co.: Wheatland 6-17-53, 6-24-53, 8-5-53, 6-30-55.

117. *Hesperia nevada* Scudder. Albany Co.: Centennial 6-20-54; Pole Mt. 6-19-54; Sybille Canyon 6-21-53.

118. *Hesperia comma colorado* Scudder. Albany Co.: Libby Park 8-30-53; Pole Mt. 8-15-55.

119. *Hesperia harpalus idaho* Edwards. Albany Co.: Illinois-Douglas Creek jct. 7-4-55; Pole Mt. 8-23-53, 9-5-53, 8-15-55; Sybille Canyon 6-27-53.

120. *Hesperia pahaska* Leussler. Platte Co.: Guernsey 7-9-53.

121. *Ochlodes sylvanoides napa* Edwards. Albany Co.: Centennial 8-15-53; Pole Mt. 8-15-55; Woods Landing 7-28-54.

122. *Polites themistocles* Latreille. Albany Co.: Sybille Canyon 6-27-53.

123. *Polites draco* Edwards. Albany Co.: Illinois-Douglas Creek jct. 7-4-55; Pole Mt. 6-19-54; Sybille Canyon 6-27-53; U.W. Sci. Camp 7-3-53; 7-5-54. Carbon Co.: Ryan Park 7-1-55.

124. *Polites sonora utahensis* Skinner. Albany Co.: Pole Mt. 8-7-53, 8-8-54, 7-30-55.

125. *Poanes taxiles* Edwards. Platte Co.: Guernsey 6-23-53.

126. *Atrytone ruricola* Boisduval. Albany Co.: Pole Mt. 8-15-55. Platte Co.: Guernsey 7-16-52, 6-10-53.

127. *Atrytonopsis hianna* Scudder. Platte Co.: Guernsey 5-18-54.

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With very great regret, we have just received word of the death of Brigadier W. H. Evans, an Honorary Life Member of the Society. The distinguished authority on the Hesperiidæ of the world passed peacefully away in his sleep, apparently on 13 November. A biographical obituary, accompanied by a complete list of published work on Lepidoptera, will be published in a later issue of the *News.*

C. L. Remington

NOTES ON *SPEYERIA EGLEIS SECRETA* (NYMPHALIDÆ)

by DONALD EFF

An article entitled "A Collecting Trip in Search of *Speyeria egleis secreta*" (Remington & Eff, 1948) recounted a very pleasant collecting trip which was noteworthy because it marked the first time that *Speyeria egleis secreta* dos Passos & Grey was taken in quantity. Prior to that time, the only other articles on *S. secreta* were the original description and a discussion of the type locality (Remington, 1947).

After our success in 1948, our catch of *Speyeria secreta* and *S. atlantis* Edw. was identified by L. P. GREY of Lincoln, Maine, and then shipped intact to each of us in turn. This permitted us to make full comparisons and to note the differences readily discernible in large series; we then found that we had been guilty of overconfidence in assuming that we could recognize *secreta* in the field. In following years subsequent captures and attempts at determination proved that many of our correctly applied names were lucky guesses, for while the differences may be readily recognizable when seen in series, identification of individual specimens is quite another matter. I have collected *secreta* 4 of the 7 years which have passed since that time, but until 1955 my principal success was only in becoming increasingly confused! Part of this inability to identify correctly was due to insufficient study, and the balance of it because this is one of the closest resemblances found in *Speyeria,* and certainly the closest in any *atlantis-egleis* relationship. Also the type locality of *secreta* on Rabbit Ears Pass is a *Speyeria* collector's paradise where in a descent of the western side of the Pass, a distance of about 20 miles, it is possible to take *Speyeria edwardsii* Reakirt, *S. hydaspe sakuntula* Skinner, *S. zerene sinope* dos P. & Grey, *S. zerene* intermediates close to *garretti* Gunder and *platina* Skinner, *S. egleis secreta, atlantis* (ranging from near *dorothea* Moeck to near *hesperis* Edw., *electa* Edw., *nikias* Ehr. and even near Appalachian *S. atlantis atlantis!*), a western race of *S. aphrodite* Fab. (rare), *S. callippe nevadensis* Edw., *S. eurynome* Edw., *S. coronis* Behr, (near *halcyone* Edw. and *snyderi* Skinner), and *S. cybele charlottii* Barnes! Small wonder then that a collector becomes confused in this maze of variation, for with one swoop of the net it is possible to capture 3 or 4 different *Speyeria,* and hundreds of specimens in a day if willing to forego other genera.

Before entering on the observations noted this year, it may be advisable to point out the differences whereby *secreta* is separable from *atlantis.* To begin, one must remember that gradients of apparently valid species of *Speyeria* approach to common facies in certain localities, however widely they may differ when found sympatrically a few hundred miles away; by tracing the intergrades closely one can demonstrate that it is quite possible for subspecies of a single species to be predominantly brown in one area, green in another, and so on, thus showing a scope of variation unthought of until the day of the modern specialists and their accumulated series from many localities. As mentioned before, material from Rabbit Ears Pass demonstrates the nearest approach of the two gradients *egleis* and *atlantis* yet known. The most common color phase of *secreta* is almost identical with *atlantis tetonia* dos P. & Grey of N.W. Wyoming. Fortunately, this color phase does not occur in the *atlantis* taken on Rabbit Ears Pass, (or if so, then only rarely) for if it did, then it would be impossible to separate the two species. The band suffusion is common in *secreta* and approaches totality in many specimens, as it does in *tetonia,* but *atlantis* band suffusion does not appear at this point in its range. *Speyeria secreta,* with a not-too-wide spread of variation, yields occasional brown forms much like *macdunnoughi* Gunder as found in Wyoming, and understandably so, since *macdunnoughi* also displays occasional red *secreta*-like individuals. In size, *secreta* is smaller than *atlantis,* although individual specimens overlap in this characteristic. Average size of *atlantis* in expanse of primary is 63-64 mm., while that of *secreta* is 59 mm. Probably the most distinct and useful feature is the ruddiness seen in the mesial area on the underside of the *atlantis* primary, as contrasted to the dead light tan found there in *secreta.* One other feature is that the hindwing band of *atlantis* is likely to stand forth clearer, lighter, wider, and less liable to suffusion; in *secreta* this band is often suffused, or nearly so. Above, *secreta* is a lighter neutral brown by contrast with *atlantis,* which averages to ruddy phases like those found along the Plateau south to New Mexico, darker in pattern contrast. For the first time, enough females have been taken to prove that they follow the differences discernible in the males to a large extent. Unsilvered forms occur in both, although sparingly. Once one is able to separate *secreta* from *atlantis,* another obstacle is presented by *aphrodite,* which occurs sparingly here in a color phase near *secreta* and *atlantis,* but is separable by the thin wing venation of the male primary.

With the exception of Professor NABOKOV'S captures near Encampment, Wyoming, and his recognition of *secreta* at a point where the two species *atlantis* and *egleis* do not so closely approximate each other, there have been no satisfactory observations made with regard to *secreta* because of faulty identifications in the field. This year, additional precautions were taken. All *Speyeria* from one locality were given a number, notes made with regard to habitat and habits, and the specimens from each area were kept separate. Immediately upon return home all were relaxed and restudied in comfort and leisure. The results were even better than I had hoped for.

My field companion this year was RONALD LEUSCHNER. We crossed the Continental Divide at Muddy Pass, where the elevation is only 8772 feet, and continued climbing from there to Rabbit Ears Pass, crossing at an elevation of 9680 feet. Traveling westward from here you are in the subalpine zone on a gradually sloping plateau. The evergreen forest is spotty, and most of the land is quite open. There are marshy areas, usually the source of a small stream, around which grow scrub willow, western "skunk cabbage" and many other plants. The vegetation is lush, but the collecting here is poor. The Walton Creek Campground is a convenient headquarters and marks the edge of the real descent. From here, the road winds rapidly down through the montane and foothills zone to the Yampa Valley which has an altitude of 6300 feet. Although descending through only two plant zones, there are three distinctly different ecological belts at the various elevations. Uppermost are the conifers, most of them now dead from the ravages of the bark beetle. Next below groups of aspen begin to appear among the pines, and soon the area is composed almost entirely of aspen with an undergrowth of waist-high bracken. Continuing downward, there appear among the aspen the first sentinels of the oaks, and eventually, near the bottom of the descent, the aspect changes to an area covered entirely with oak and sagebrush. All this is within a distance of approximately 20 miles!

The next day, July 13th, being a favorable one, LEUSCHNER and I started in the morning with a plan to "spot" collect. As the road winds down through the pine belt, there are wide turnouts on various curves. Near the sign marking the beginning of the "Ski Trail," and in another nearby spot, we stopped and collected in the open glades and under the trees. The openings were alive with wild flowers, especially wild geraniums. Descent of any hillside always ends in some ravine where it is wet underfoot with a tangle of growth extremely difficult to push through. Here, a little later in the year, on a tall yellow flower much like the Golden Ragwort you will find *S. zerene sinope* females. These two spots that we collected in the conifer belt are referred to hereafter as Area No. 1. Along the sides and tops of the ridges under the pines, the ground cover is huckleberry. Here and there are small open areas among the trees, as well as along the roadway where the trees have been cut back for a short distance. The bulk of our collecting here was done around the flowers in the little open areas, but *S. hydaspe* was to be found frequenting almost any spot where the sunlight could sift through the trees. I took 23 male *hydaspe sakuntula* here in two days, LEUSCHNER about the same number, and we missed many, many more, for they are not easy to capture. However, we saw enough to know that this butterfly is not as uncommon in Colorado as generally believed, but it is definitely restricted in habitat. *Speyeria sinope* was also fairly common here, *secreta, nevadensis,* and *eurynome* were scarce, and only one *atlantis* was taken.

Continuing down the west side for something like 7 miles, the ecology changes from pine and huckleberry ground cover, with an occasional clump of aspen, to practically solid aspen with only a scattered pine here and there, and a ground cover composed mostly of a solid mass of bracken. Other plants found in favorable spots include chokecherries, mint, and asters. The Yampa View Campground was our stopping place for collecting forays in this, Area No. 2, the aspen belt. Just north of this campground there is an old road, along which we collected for this is the area usually collected in the past, and the one where the most confusion with regard to separating *secreta* from *atlantis* had arisen, although *secreta* here is in the minority. This is the real habitat of *atlantis* on Rabbit Ears Pass. *Speyeria sinope* and *eurynome* also occur here in good numbers. In the minority are *navadensis* and *hydaspe,* the latter becoming more plentiful higher up. And, incidentally, this is the place for *S. cybele charlottii* during the last week of July.

The following day (July 14th) we again collected at Area No. 1 but did not spend nearly as much time there as we had the preceding day, then hurried on down the west side, bypassing Area No. 2, and collected in what

I shall call Area No. 3. Specifically, this is about 3 miles down the road from the Yampa View Campground, or about a half-mile below the Valleyview Lodge. From Yampa View Campground to Valleyview Lodge the aspen become thinner and thinner as the oak becomes increasingly plentiful. Below the lodge about the only tree to be found is the oak. The ground cover is of sagebrush. Most of the flowers found here are hidden under the edge of the oaks and in and under the sagebrush. This is hot, dusty, miserable collecting, for the *Speyeria* fly in and under and through the sagebrush and the oak, all of which makes it extremely difficult to net them . . . and amazingly easy to ruin a net! However, we were surprised to learn that here, apparently, was the real home of *secreta!* The other *Speyeria* to consider in this area was *nevadensis*. Only one *atlantis* was taken here. The males of *secreta* were busy searching the underbrush for females and all were in fresh condition. We were here only a short time, but I took 18 ♂ ♂ and 1 ♀ of *secreta,* 2 ♂ ♂ of *zerene sinope,* and the aforementioned *atlantis*. Leuschner's catch was approximately the same. A number of *nevadensis* were seen, and several taken and then released since all seemed to be battered from flying through the brush. Normally, *nevadensis* Edw. is uncommon in Colorado.

In conclusion then, the type locality of *Speyeria egleis secreta, i.e.* the west side of Rabbit Ears Pass, Routt County, Colorado, is divided into three distinctly different ecological zones. These zones can be distinguished easily by the predominance of one of three trees: Area No. 1, the uppermost zone, by the presence of conifers; Area No. 2 by the growth of aspen; Area No. 3 by the growth of oak. My records of captures of *Speyeria* in each zone are as follows for 1955:

Area No. 1			Area No. 2			Area No. 3		
	♂	♀		♂	♀		♂	♀
hydaspe	23	0	*charlottii*	12	1	*zerene*	2	0
zerene	13	6	*hydaspe*	6	1	*egleis*	18	1
egleis	6	4	*zerene*	13	1	*atlantis*	1	0
nevadensis	2	0	*egleis*	20	6	*nevadensis*		
eurynome	2	2	*nevadensis*	1	0	(a number taken but released)		
atlantis	1	0	*eurynome*	7	1			
			atlantis	39	6			

Area No. 1 was collected twice, July 13 & 14; Area No. 2 was collected twice, July 13 & 23; and Area No. 3 only briefly, on July 14th. It should be pointed out that the number of *egleis* taken in Area No. 2 is not indicative of the ratio of appearance, for since they were the main objective, more effort was expended in capturing any specimens thought to be *egleis secreta* than was directed toward the others. Using the above record of captures as a yardstick, and correlating the written and mental notes made for each area, we arrive at these conclusions: That each aforementioned ecological zone is the true home of one or two species of *Speyeria*. The *hydaspe* is an inhabitant of the conifers, but does stray into the edge of the aspen belt although apparently it never crosses into the oak and sagebrush region. *Speyeria charlottii* and *atlantis* have as their habitat Area No. 2, the home of the aspen. These two are the greatest "stay at homes." It would seem that the oak-sagebrush area (No. 3) is typical for *secreta* and *nevadensis* although *secreta* strays enough to make it fairly common in Area No. 2. The appearance of *secreta* in Area No. 2 might be because of an inclination on the part of the females to seek higher ground. This is common in some species, such as *Speyeria aphrodite ethne* Hem., to name an example; the males usually are found on the edge of the plains, in grassy and weedy fields, whereas the females are found much higher up in the foothills, frequenting flowers such as *Monarda,* on the hillsides and in the ravines, and apparently never visiting the fields which the males are so industriously searching. *Speyeria nevadensis* is a fast and powerful flier, and although not straying in very large numbers, will stray longer distances. *Speyeria zerene sinope,* although this is not indicated by the number captured in Area No. 3, is common everywhere. To the west, near Axial, Colorado, it is found as commonly in the valley bottoms as in the surrounding oak-sagebrush belt, but on Rabbit Ears Pass its main stronghold seems to be the upper two areas, as is the case with *eurynome.* Area No. 2 was collected on July 13th, and yielded 11 ♂♂ and 1 ♀ of *atlantis* and 16 ♂♂ and 1 ♀ of *secreta,* and by way of comparison when I collected on July 23rd I took 28 ♂♂ and 5 ♀♀ of *atlantis* and 4 ♂♂ and 5 ♀♀ of *secreta.* Considering that all *atlantis* taken the first time were extremely fresh specimens, and then examining the ratio of *secreta* males and females taken the second time, it becomes apparent that the peak of the flight period for *secreta* is earlier than that of *atlantis,* although there is considerable overlapping. This is a fact of considerable interest in view of the need for further definitions whereby to judge the separateness of these two amazingly similar gradients. The above summary of observations is not intended as a scientific discourse, but has been written at the request of L. P. GREY because these were the first communications he has received giving the ecological correlations of *secreta* and information as to the females, which heretofore have been great rarities. It is the first time that on-the-spot field identifications were correctly made, without which no ecological observation could be presumed trustworthy. Perhaps this will help to guide further field studies permitting the uncovering of other *secreta* secrets.

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820 Grant Place, Boulder, Colo., U. S. A.

A COLLECTION OF RHOPALOCERA FROM THE WHITESHELL FOREST RESERVE, MANITOBA

by Charles D. Bird

During 1954 and 1955 the writer collected both Rhopalocera and Heterocera at Red Rock Lake in the Whiteshell Forest Reserve, near Rennie in the southeast corner of Manitoba.

All specimens were taken within a ten mile radius of Red Rock Lake. This area is situated in the Canadian Shield and is dominated by numerous rock outcrops, rock ridges, frequent acid bogs, and many small lakes. The dominant trees are Black Spruce (*Picea mariana* (Mill.) BSP), Larch (*Larix laricina* (DuRoi) K.Koch), Aspen-poplar (*Populus tremuloides* Michx.) Jack Pine (*Pinus banksiana* Lamb.), and Paper Birch (*Betula papyrifera* Marsh.).

This portion of Manitoba is of great interest as it has been poorly collected and because it is a meeting-ground for eastern and western as well as nothern and southern forms. The latter feature is especially well shown by this list.

During these two summers, the following were collected:

PAPILIONIDÆ. — *Papilio glaucus canadensis* R. & J.

PIERIDÆ. — *Euchloe ausonides* Bdv., *Colias eurytheme* Bdv., *C. philodice* Latr., *C. interior* Scud., *Pieris rapæ* L., *P. napi* L.

SATYRIDÆ. — *Lethe portlandia* Fabr., L. *eurydice* Joh., *Euptychia cymela* Cramer, *Œneis macounii* Edw.

NYMPHALIDÆ. — *Euptoieta claudia* Cramer, *Speyeria atlantis* Edw., *S. cybele* Fabr., *S. aphrodite* Fabr., *Boloria selene atrocostalis* Huard, *B. toddi* Holland, *Melitæa nycteis reversa* Cherm. & Cherm., *Phyciodes tharos* Drury, *Polygonia satyrus* Edw., *P. faunus* Edw., *P. progne* Cramer, *Nymphalis j-album* Bdv. & Lec., *N. milberti* Latr., *N. antiopa* L., *Vanessa virginiensis* Drury, *Limenitis arthemis rubrofasciata* B. & Mc D., *L. archippus* Cramer.

LYCÆNIDÆ. — *Strymon titus* Fabr., *S. acadica* Edw., *S. liparops* Bdv. & Lec., *Incisalia augustinus* Westwood, *I. niphon clarki* T.N. Freeman, *Feniseca tarquinius* Fabr., *Lycæna epixanthe* Bdv. & Lec., *L. dorcas* Kirby, *Everes comytas* Godart (or *E.amyntula* Bdv.), *Lycæides argyrognomon scudderii* Edw., *Glaucopsyche lygdamus* Doubleday, *Lycænopsis argiolus* L.

HESPERIIDÆ. — *Thorybes pylades* Scud., *Pyrgus centaureæ freija* Warren (or *loki* Evans), *Erynnis icelus* Scud. & Burg., *Hesperia leonardus* Harris, *H. laurentina* Lyman, *Poanes hobomok* Harris, *Amblyscirtes hegon* Scud.

RHOPALOCERA OF SPECIAL INTEREST

Feniseca tarquinius was represented by only one specimen, a newly emerged male taken on 15 June 1954. This is believed to be the third record of this butterfly from Manitoba. The first was collected by Mr. Wallis in the Sandilands

Forest Reserve and is recorded in BROOKS' (1942) check list. The second specimen was captured by Mr. C. S. QUELCH on 5 June 1954 in the Sandilands Forest Reserve.

Lycæna epixanthe is a completely unrecorded butterfly for Manitoba and is not mentioned in any of the early lists of Manitoban butterflies (*i.e.* Wallis 1921, Brodie 1929, Brooks 1942). It was first discovered while collecting in a rather open Larch bog where the presumed food plant, *Vaccinium oxycoccos* L. was found in some quantity. The writer and Dr. A. B. KLOTS, collecting together, also found *Lycæna dorcas* flying with it.

Three males of *Œneis macounii* were collected on 20 June 1954 and one female on 26 June 1954. This is a definite range extension as BROOKS (1942) records it only from Victoria Beach some sixty-five miles to the northwest.

The capture of a specimen of *Pyrgus centaureæ freija* (or *loki*) on 13 June 1954 is quite notable. According to BROOKS' (1942) list, it has been recorded only from Churchill and Gillam, both far to the north. Correspondence with Mr. WALTER KRIVDA of The Pas indicates that he has taken it there also, though he remarks that it is quite a rarity. As this was such a range extension the specimen was sent to Dr. A. B. KLOTS for identification.

Few subspecies names have been given, owing to the uncertain status of many subspecies in this more or less borderline zone between various faunas. The *Speyeria* and *Boloria*, for example, could not be clearly allocated to any named subspecies or stage in a clinical population.

Specimens representing these records have been deposited in The American Museum of Natural History and the Entomological Laboratory at Brandon, Manitoba, where they can be studied by future workers on distribution and geographic variation.

Thanks are due to Dr. A. B. KLOTS, Dr. R. D. BIRD, Dr. J. C. RITCHIE, and Mr. J. B. WALLIS for carefully reading this manuscript and for offering many helpful suggestions.

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1930 Rosser Ave., Brandon, Man., CANADA

NOTES ON *MEGATHYMUS POLINGI* (MEGATHYMIDÆ)

by DON B. STALLINGS and J. R. TURNER

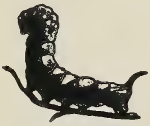
Megathymus polingi Skinner is another of the species of *Megathymus* that does not appear to have been collected in recent years. For many years the only specimen in our collection was a single male that was collected about the time that the species was named.

Due to misidentification of this species (we have seen specimens of at least three other species labelled *M. polingi*) there has been a question in some peoples' mind as to whether *M. polingi* was a good species. Since 1946 we had felt sure that we knew the food plant, but it was not until September of 1955 that Dr. and Mrs. R. C. TURNER succeeded in collecting larvæ of this species. Of the twelve larvæ they collected between Redington and Tucson, Arizona, nine pupated and emerged from Sept. 27th to October 16th.

This species, which is the smallest of the known species in the U. S. A., is easily identified by the well defined yellow-white discal band across the undersurface of the secondaries. The genitalia are also distinctive. The food plant is *Agave schottii* Engelmann. This species of *Agave* belongs to the group of species with the inflorescence spicate and is the smallest of true *Agave* in the U. S. A. The plant is so small that the larvæ are unable to use the leaves alone for the larval cavity but must bore over half of the cavity in the base of the plant. They do not make an outlet until shortly before they pupate. The outlet, which comes through several leaves, has the usual "trap-door". We doubt that *M. polingi* uses any food plant other than *A. schottii.*

Megathymus polingi, M. mariæ Barnes & Benjamin, and *M. stephensi* appear to be the only *Agave* feeders in the U. S. A. which, during the larval stage, deposit their excrement outside the burrow, similar to the *Yucca* feeders. The other *Agave* feeders in the U. S. A. have little or no excrement to dispose of; at least there is no external sign of it.

Caldwell, Kansas, U. S. A.



The check list of the Lepidoptera of Florida, by C. P. KIMBALL, is nearly ready for the printer. It has been held so that the new HEINRICH Phycitinæ revision could be used for the treatment of that subfamily in the check list. Some colored plates will be printed in the list, which is to be published by the Florida State Plant Board.

C. L. REMINGTON

NOMENCLATURE NOTICE

Notice is hereby given that the possible use by the International Commission on Zoological Nomenclature of its Plenary Powers is involved in applications relating to the under-mentioned names included in Part 10 of Volume 12 of the *Bulletin of Zoological Nomenclature,* which will be published on 31st October 1956:

1. *Cupido* Schrank, 1801, designation of a type species for, in harmony with accustomed usage (Class Insecta, Order Lepidoptera) (Z.N. [S.] 1138);
2. *jurtina* Linnæus, 1758 (*Papilio*), grant of precedence to, over *janira* Linnæus, 1758 (*Papilio*); EPINEPHELDI Tutt, 1896, suppression of (Class Insecta, Order Lepidoptera) (Z.N. [S.] 1142).

Attention is also drawn to the proposed adoption of a *Declaration* regarding the method to be followed in determining the relative precedence to be accorded to two or more names for family-group taxa published in the same book and on the same date (Z.N. [S.] 1141).

The present Notice is given in pursuance of the decisions taken on the recommendation of the International Commission on Zoological Nomenclature, by the Thirteenth International Congress of Zoology, Paris, July 1948 (see *Bull. zool. Nomencl.* 4:51-56, 57-59; ibid. 5:5-13, 131).

Any specialist who may desire to comment on any of the foregoing applications is invited to do so in writing to the Secretary to the International Commission (Address: 28 Park Village East, Regent's Park, London, N.W.1, England) as soon as possible. Every comment should be clearly marked with the Commission's File Number as given in the present Notice, and sent *in duplicate.*

If received in sufficient time before the commencement by the International Commission of voting on the application in question, comments received in response to the present Notice will be published in the *Bulletin of Zoological Nomenclature;* comments received too late will be brought to the attention of the International Commission at the time of the commencement of voting on the application in question.

Under the decision by the International Congress of Zoology specified above, the period within which comments on the applications covered by the present Notice are receivable is a period of six calendar months calculated from the date of publication of the relevant Part of the *Bulletin of Zoological Nomenclature.* The Part now in question will be published on 31st October 1956. In consequence any comments on the applications published in this Part should reach the Secretariat of the International Commission at the latest by 30th April 1957.

FRANCIS HEMMING
Secretary to the International Commission
on Zoological Nomenclature

Brigadier W. H. EVANS, author of the recent *Catalogue of American Hesperiidæ,* has notified the *News* that "Addenda and Corrigenda" have been printed and a copy sent to every known recipient or purchaser. If not received, application for a copy should be sent to: "The Publications Officer," British Museum (Natural History), Cromwell Road, London S.W. 7, England.

FIELD NOTES

THE STATUS OF *CISTHENE SUBJECTA* (ARCTIIDÆ) ON LONG ISLAND, N. Y.

The little Arctiid moth, *Cisthene subjecta* Walker, has been recorded breeding on Long Island. However, no preserved material can be located or living collectors who have seen the moth on the island, except the series from Orient. For a long period, 1915 to 1949, none was noted in Orient. A single moth appeared in 1949 and two to five each season thereafter until 1955, when, with only a part of those observed taken, a series of 86 specimens was collected at light in Orient. They include both sexes, mostly in fresh condition. The rapid increase in the past six years indicates a local breeding colony. This presumption is substantiated by the old Long Island breeding record at Bellport, recorded by Dr. H. G. DYAR (*Proc. U. S. Nat. Mus.* 23: 266-268; 1901) who described the eggs and larvæ of *C. subjecta*. the eggs August 9th and the larvæ hibernating in October. If the individuals here are southern migrants, why the long span of 34 years with no record and why the local concentration in Orient?

All the material observed at light in Orient has been in August, from the 9th to the 30th. A tabulation of the 1955 data shows a maximum of 34 moths on August 15th, 20 on the 16th, 17 on the 17th, 14 on the 20th, and one on the 30th. The food plant is listed as lichens.

This is a brightly colored moth when the wings are expanded. With wings closed, as they frequently are at light, the moth is small and unobtrusive with a coleopterous appearance.

The species apparently breeds regularly, north to Delaware. There is a single old record, 1868, from Nantucket Island in the Boston Society of Natural History, listed by KIMBALL in *The Lepidoptera of Nantucket and Marthas Vineyard* (1943). I have not investigated other northern records outside Long Island.

ROY LATHAM, Orient, L. I., N. Y., U. S. A.

MELANIC *DANAUS* AND *COLIAS* NEAR CHICAGO

Two unusual captures in the Chicago area may be of interest to readers of *The Lepidopterists' News.*

On August 15, 1954, at Hammond, Indiana, Mr. EUGENE DLUHY caught a specimen of *Danaus plexippus,* a male, that was decidedly out of the ordinary in appearance. On the upper side, all white spots and the yellow spots between the cell and apex of primaries are replaced by black. The three brown areas near the apex are faintly indicated, but the checkered white margin on all wings appears as usual. These changes leave the normal central brown area bordered by deep black with a large black apical area. Veins are black as customary. The under side shows the yellow apical spots about as in the normal form; in place of the white submarginal spots are three small pale bluish spots in a single row; two costo-apical white spots are replaced by two much smaller bluish white spots and two white spots midway between cell and apex are indicated in a similar manner. On the secondaries only one white spot is indicated, that being in the subcostal interspace. Basal white spots and those on the body are present as normally. Expanse, 4 inches.

On August 5, 1955, Mr. DONALD OEMICK caught a melanic specimen of *Colias philodice,* a male, in which the normal black border of all wings was of a dark olive green and the normal yellow area entirely black. The specimen was perfect. High temperature that day was 90°F. The place of capture was near the West shore of Lake Calumet just south of the Sherwin Williams paint manufacturing plant in a heavily industrial district. A busy highway lies between the lake and the place of capture, adding to the factory fumes. That the smoky and gaseous atmosphere, such as exists here, may be the cause of such melanism, has often been contended.

ALEX K. WYATT, 5842 N. Kirby Ave., Chicago 30, Ill., U. S. A.

TWO NEW MELANIC *SPEYERIA* (NYMPHALIDÆ)

I recently obtained from Mr. M. K. STEFFEN of Freeport, Illinois, two aberrant *Speyeria* which he captured while collecting in Vilas Co., Wisconsin. The first of these (ab. a.) was taken on August 7, 1952, and the second (ab. b.) on August 13, 1953. These butterflies were sent to Mr. L. P. GREY of Lincoln, Maine, for identification and found to be *S. aphrodite* Fab. Descriptions of the aberrations follow:

ab. a. ♀ — The black markings on both the upper and under surfaces are greatly enlarged and fused, and the ground color of the upper surface is obscured. The ground color of the secondaries beneath is dark cinnamon brown, and the light submarginal band is lacking. The silver spots on the primaries are elongated. The silver spots on the secondaries are reduced in number, the median row entirely wanting, the basal spots fused into four elongate markings radiating from the base. Arbogast Coll.

ab b. ♂ — The black markings on the upper and under surfaces of the primaries are enlarged and fused. The silver spots on the primaries are elongated. The right primary is deformed. The black markings on the upper and under surfaces of the secondaries are enlarged and greatly reduced in number. The submarginal light band on the secondaries beneath is lacking. The silver spots on the secondaries are reduced in number, the submarginal row fused with the median row, the basal spots fused into four elongate markings radiating from the base. Arbogast Coll.

R. T. ARBOGAST, 1216 South High Ave., Freeport, Ill., U. S. A.

LEPTOTES MARINA AND *ECHINARGUS ISOLA* (LYCÆNIDÆ) TAKEN IN ILLINOIS

On 5 September 1953, I collected a female of *Leptotes marina* (Reakirt) near Hamlet, Mercer County, Illinois. The specimen, with the exception of a small nick in the margin of the forewing, was in very fresh condition. It was taken while feeding on Goldenrod.

The following year, on 22 June 1954, a female of *Echinargus isola* (Reakirt) was taken at the same locality as the *L. marina.* This specimen was in perfect condition, looking as if it had recently emerged. It was taken while flying in association with *Everes comyntas, Lycæna thoe,* and *L. xanthoides dione* in a marshy area.

It is interesting to note how far these two specimens were from their given ranges. BROWN, EFF, and ROTGER in Part III of *Colorado Butterflies* (page 168) list the range of *L. marina* as: Mexico northward into the Mississippi valley as far as southern Kansas and southern California. On page 160 they give the range for *E. isola* as follows: southern Mexico northward west of the Mississippi to Nebraska and British Columbia. Due to the lack of foodplants and the difficulties of overwintering, it appears that these must be strays.

PATRICK J. CONWAY, R.R. 3, Box 131, Aledo, Ill., U. S. A.

SOUTHERN LEPIDOPTERA ON CAPE COD AFTER HURRICANES

Immediately after the first two hurricanes of 1954, both of which passed either directly over Barnstable or within a very few miles, Lepidoptera were not much in evidence, partly on account of a continuance of poor weather. However, on the night after the third hurricane, which passed at least 200 miles west of Barnstable, six essentially southern species turned up in the light-trap: *Anticarsia gemmatilis* Hbn. (2), *Mocis latipes* Guen. (3), *Hormoschista latipalpis* Wlk., *Callopistria floridensis* Guen., *Amyna octo* Guen. (3), and *Anepischetos minualis* Wlk. (2) (all Noctuidæ); and *Hellula rogatalis* Hulst (Pyralididæ). With the possible exception of *Herse cingulata* Fabr., which, as I have stated before, I believe established locally, no other southern strays have been seen at any time this season.

CHARLES P. KIMBALL, West Barnstable, Mass., U. S. A.

ESPECIALLY FOR FIELD COLLECTORS

(Under the supervision of JAMES R. MERRITT)

EDITORIAL NOTE: — In the following, two articles continue the series on noteworthy collecting localities, and with them is the latest in the discussion of the number of species to be found in one locality at one time.

The editor for this "Collectors'" section has been forced to resign, effective at the end of this year, due to new professional pressures. The editorial duties will be taken over by Mr. FRED THORNE, veteran southern California lepidopterist. The advisory committee for this section of the *News* will continue to be: GEORGE EHLE of Pennsylvania, RICHARD GUPPY of British Columbia, and WILLIAM E. SIEKER of Wisconsin. New correspondence for this section should be addressed to Mr. THORNE (1360 Merritt Dr., El Cajon, Calif., U. S. A.).

SAN FRANCISCO'S VANISHING BUTTERFLIES

by J. W. TILDEN

During the Second World War, or shortly thereafter, there occurred in San Francisco, California, an event which affected the average inhabitant of the area but little. It was, however, of considerable interest to entomologists. If the mythical average man had known, he might have cared still less. But to lepidopterists, it meant the end of a losing battle for one more of our native creatures. This event was the passing into extinction (so far as known) of the peculiarly local and endemic butterfly of the sand dunes, the Xerces (*Glaucopsyche xerces*) Blue. Only a few years before, it had been the most characteristic butterfly of the coastal sand dune area known as the Sunset District, but complete settlement of the area left it no habitat to inhabit.

Xerces is not alone among the peculiar butterflies of San Francisco. Why this region should have been inhabited by a number of endemics is not clear. The coastal region of California is rich in relict forms, but the immediate environs of San Francisco seem to have been more than usually endowed in this respect.

The first species to disappear was *Minois sthenele.* This species was lost so early and so rapidly that few specimens remain. The largest series was destroyed in the fire of 1906. The early stages were never recorded. Since it became extinct too early in the history of the area, almost anything that may be written concerning it is in the nature of conjecture. It is interesting to speculate on why it became extinct so rapidly, since it was at one time considered common. It disappeared, oddly enough, while there was still a good deal of unsettled land in the city.

Another satyr, *Minois behrii,* was the next to be lost. The locale is different, but the story is much the same. *M. behrii* was recorded as flying in the Mt. Tamalpais area in Marin County, just north of the Golden Gate.

It is not in a strict sense a butterfly of San Francisco, but is included here for regional completeness. The types of this species were also destroyed in the San Francisco fire, and no further material has ever been taken on the type locality. *Minois masoni* Cross is similar to the description of *M. behrii* and has been considered as subspecies of the latter by F. M. BROWN (*Butterflies of Colorado*: p. 18; 1954). HOLLAND (revised *Butterfly Book,* 1930) figures on Plate LXXI, figs. 9 & 10, insects which he refers to *M. behrii.* However this may be, the insect is apparently extinct at the type locality.

The endemic lycænids of the region were more persistent. In the 1930's *Glaucopsyche xerces* still could be found in the vacant lots of the Sunset District and in the Lake Merced area. Some survived for years in Fort Funston, but these apparently disappeared when the area was bulldozed bare. At present the former habitat of *xerces* is almost one hundred percent settled. Most collectors who are familiar with the conditions concede that *xerces* is apparently extinct, although the exact time is not easy to fix. I am not sure that any have been taken since the Second World War. It is conceivable that the species may reappear, but such a possibility seems remote.

Why did it disappear? Here and there in the region remain waste strips and roadside vegetation that harbor certain insects. These do not seem to have been sufficient for *xerces.* The most probable answer lies in the food plant. In the larval stages, *xerces* fed on a species of *Lotus* (*Hosackia*). This species was a low-growing matting type of sand dune plant which could not tolerate disturbance of the soil. In some places the plant seemed to disappear before the butterfly did. HOVANITZ (personal conversation) noted having seen *xerces* oviposit on Lupine, but observations showed that this plant was not suitable for the larval development of *xerces.*

Xerces is of interest for another reason than its local distribution. It exhibits, in as great a degree as any other North American butterfly, the peculiar effect of certain mutations on small populations. In this one species, there are no fewer than five named variants. Typical *xerces* has large white spots on the secondaries below. The form "polyphemus," which was the "normal" or common form, has small black pupils in the white spots. The forms "mertila," "antiacis" and "huguenini" represent increasing size of the spots, especially of the black pupils. "Polyphemus" and the other black-pupilled forms are easy to associate, but true *xerces* looks very different. DYAR (*List of North American Lepidoptera,* 1902) did not associate *polyphemus* and *xerces* at all, but placed *xerces, antiacis* and of course *lydgamus,* as separate species, with what we now know as *G. lygdamus behrii* as a subspecies of *antiacis.* This association is easily seen to be faulty when specimens of all are at hand, since the soft lavender blue of all forms of *xerces* is quite different from the cold blue of *lygdamus* subspecies. Moreover, all of the *xerces* complex have the short rounded forewing of that species. These named segregates of *xerces* are merely genetic variants. All were found flying together in the same locality and are in no true sense subspecies. They show to a marked degree the effect that genetic mutations may have on a small population.

Almost as remarkable as *G. xerces* is another lycænid, *Plebeius icarioides pheres.* So much paler below is this subspecies that it was for years considered a distinct species. Its fate is less definitely known than is that of *xerces.* A small colony existed in the Presidio until quite recently. Military activities in that area seem to have destroyed its habitat. Whether or not it is really extinct, I cannot ascertain. However, if it persists today, it has been overlooked in recent years by the many collectors who have searched for it. Numerous specimens of a somewhat similar subspecies from Marin County have been found in recent years, but these seem not to represent true *pheres.* I am inclined to think that the name *pheres* should be restricted to specimens actually taken in San Francisco, at least until the situation has been much more thoroughly studied.

On the topmost portion of the famous Twin Peaks of San Francisco is found a subspecies of *icarioides* that was described by HOVANITZ. This isolated area seems to be the only locality for *P. i. missionensis,* the Mission Blue. This is a rather heavily marked subspecies, in contrast to the very pale *pheres* which occupies an area only a few miles away. The food plant of *missionensis* is a low perennial Lupine of the *chamissonis* groups. Human settlement is beginning to encroach on its already restricted habitat, and the disappearance of *missionensis* is only a matter of time.

There remains to be considered one other butterfly on the list. On all of the hills in San Francisco where *Eriogonum* grows, is to be found *Callophrys viridis.* For many years this was considered by most students as a synonym of *C. dumetorum.* By some it was regarded as *C. affinis.* HOLLAND (revised *Butterfly Book,* 1930) stated that he had *affinis* from California. CLENCH (Revision of *Callophrys, Bull. Mus. Comp. Zool.* 94: pp. 226-228) pointed out the differences between *dumetorum* and *viridis* and considered *viridis* a valid species. Its exact status is not for me to decide here. It is at least easily separable from *dumetorum* on appearance alone. It flies alone, not in company with *dumetorum,* which may indicate that it is a subspecies of *dumetorum.* Like the other San Francisco butterflies, *viridis* is engaged in a losing struggle with man's encroachment.

It is interesting to note that these local butterflies have been unable to extend their ranges down into San Mateo County to the south. The more southern portions of the San Francisco Peninsula seem to be unsuitable for them. To the observer of the area, there is no ready explanation for this peculiar fact. Even the flora seems alike enough to have allowed for this extension. The whole story seems to show what has been shown before, that specialization is a one way street with no return.

This history of San Francisco's butterflies is obviously incomplete. It is hoped that other observers will be stimulated to add their information to the knowledge of this interesting matter.

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MY HIGHEST BUTTERFLY CATCH OF A SINGLE DAY IN THE MIDDLE EAST

by E. P. WILTSHIRE

Stimulated by the interesting notes of Dr. C. L. REMINGTON and Mr. F. HEMMING in Vol.9, I venture to send in the following notes culled from my entomological diaries; although my day's total is less than theirs, it is typical, I think, of a region of considerable lepidopterological interest.

I have been collecting Lepidoptera, with special attention to moths, in my spare time in the Middle East (S.W. Asia) for over twenty years. My excursions have always been in arid subtropical places. These, it is well known, are comparatively poor in butterflies, though the conditions seem to favor Phalænidæ, Pyralidæ and Gelechiidæ more. The greatest number of species is to be found in the mountains, where precipitation is greater than in the plains. I have climbed over twenty different peaks in the Middle East, and it is clear that the date of flight of the maximum number of butterflies varies with the latitude. At 29° N., mid-May is best for butterflies (though mid-June is best there for moths). At 34° N., June-July produce maximum numbers.

Between 20 and 30 different species of butterfly in a day have frequently been taken on these climbs in Lebanon, Iraq and Iran (Persia). My record catch was 31 on May 12th 1940 on Kuh Barfi, at heights of 6000-9000 ft., near Shiraz, Fars, S.W. Persia. Perhaps in N. Persia or the Lebanon more could be taken.

The Kuh Barfi is one of four mountains surrounding Shiraz, a city which lies in a plain at over 5000 ft. above the level of the Persian Gulf, from which it is about 80 miles distant as the crow flies. These mountains were formerly wooded with oak, wild almond, and *Pistacia* in a scrubby sparse formation chiefly on northward slopes, but Kuh Barfi, owing to its proximity to Shiraz, is deforested except for a few localized bushes. The vegetation on which the butterflies depend are herbs, grasses, or at the best small *Rhamnus* and *Prunus* bushes; some of the herbs, however, might qualify as "dwarf shrubs", particularly certain *Astragalus* species. On the top of the mountain there is an old-established snow-storing industry, and in April-May it is frequented by muleteers who cut the dwarf shrubs and use them to cover over the snow which they have collected and packed into pits. During the summer they carry the snow on mule-back to Shiraz, a 6-hour trek, and the path taken by these caravans down the southern slopes of the mountain provides the easiest way to the summit. One drives to the nearest point on the Shiraz — Bushire road in ten minutes from the city centre, and reaches the summit after about three or four hours' walk depending on how many times one stops to catch butterflies or refresh oneself. The more time one spends catching on the way, the less time one has to catch at the top, and one finds quite different species at the top from those at the bottom.

The same path was taken by the explorer KOTSCHY in about 1840 and it is interesting to note that the path now no longer has the stream and waterfall which he described. There is, however, a waterhole still in use just above the place where there clearly was formerly a considerable waterfall. One concludes that in the intervening century the water has sunk deeper into the limestone mountain and has been virtually lost to man.

The butterflies taken by KOTSCHY were listed by KOLLAR (1850) in *Denkschrift Akad. Wiss. Wien,* I, and included the descriptions of two new *Melitæa* species, *casta* and *persea.* For about a hundred years their identity remained a mystery to European lepidopterists who applied the two names wrongly to various Middle East *Melitæa* forms.

I climbed Kuh Barfi on May 3 & 12, 1940, and May 9, 1941; the butterfly totals on these three excursions were respectively 25, 31, and 27. The total butterfly species taken during these three visits, all made during the first half of May along the same route to the summit, were 46.

The object of my visits, of course, was not to catch as many butterfly species as possible; it was rather to investigate what, between the explorations of KOTSCHY and BRANDT (1937), had been *terra incognita* to lepidopterists. The most important result was my recapture of topo-typical *M. casta* and *persea* and discovery of the new species *M. consulis mea.* FRED BRANDT did not actually climb this mountain.

Here is the list of 46 species taken on these three visits; the 15 not taken on May 12th are in brackets. I give the height at which each was taken, in feet.

PAPILIONIDÆ

1. (1) *Papilio machaon centralis* Stgr. (5000-9000)
1. (2) [*Papilio alexanor* Esp.] (8000)

PIERIDÆ

2. (3) *Pieris rapæ iranica* LeCerf (8000)
2. (4) [*P. krueperi* Stgr.] (8000)
3. (5) *Pontia daplidice* L. (7500)
3. (6) [*Pontia glauconome iranica* Bien.] (5000-6000)
3. (7) [*Glycestha aurota* F.] (5000-6000)
3. (8) [*Anthocaris gruneri armeniaca* Christ.] (8000-9000)
3. (9) [*Colotis fausta* Oliv.] (5000-6000)
4. (10) *Colias croceus* Fourc. (5000-6000)
5. (11) *Colias aurorina libanotica* Led. (8000-9000)
6. (12) *Gonepteryx farinosa* Zell. (7500)

LYCÆNIDÆ

7. (13) *Nordmannia abdominalis gerhardti* Riley (6000-8000)
7. (14) [*Callophrys suaveola* Stgr.] (8000-9000)
8. (15) *Tomares romanovi* Christ. (6000-7000)
8. (16) [*T. callimachus* Ev. = *hafis* Koll.] (6000-7000)
9. (17) *Apharitis maxima* Stgr. (7000)
10. (18) *Lycæna phlœas* f. *eleus* F. (6000-7000)
10. (19) [*L. thersamon kurdistana* Riley] (6000-7000)
10. (20) [*Glaucopsyche cyllarus æruginosa* Stgr.] (7000-9000)
11. (21) *Turanana panagæa* H.-S. (8000-9000)
12. (22) *Plebejus pylaon iranica* Forst. (7000-8000)
13. (23) *P. eurypilus* Freyer (7000-8000)
14. (24) *Polyommatus icarus persica* Bien. (7000-8000)
15. (25) *P. loewii* Z. (5000-6000)
16. (26) *P. hyrcana* Led. (7000-8000)

NYMPHALIDÆ

17. (27) *Vanessa cardui* L. (6000-9000)
18. (28) *Melitæa cinxia amardæa* Gr.-Gshm. (8000)
19. (29) *M. consulis* Wiltshire (8000)
20. (30) *M. phœbe doræ* Graves (6000-9000)
21. (31) *M. casta* Koll. (9000)
21. (32) [*M. trivia robertsi* Butl.] (6000-9000) (larvæ seen on 12.v.40)
22. (33) *M. persea* Koll. (7000-8000)
23. (34) *Damora pandora* Schiff. (6000-9000)
24. (35) *Fabriciana niobe taura* Roeb. (6000-9000)

SATYRIDÆ

25. (36) *Melanargia larissa* Stgr. (6000-7500)
26. (37) *Chazara thelephassa* Hübn. (5000-6000)
27. (38) *C. persephone* Hübn. ditto
27. (39) [*Pararge megera iranica* Riley] (8000)
27. (40) [*Epinephele lupinus centralis* Riley] (6000-8000)
28. (41) *Cœnonympha saadi* Koll. (6000-7000)

HESPERIIDÆ

28. (42) [*Erynnis marloyi* Boisd.] (7000)
29. (43) *Carcharodus floccifera orientalis* Rev. (7000-8000)
30. (44) *Muschampia tessellum tersa* Evans (7000-8000)
30. (45) [*Muschampia poggei* Led.] (7000-8000)
31. (46) *Thymelicus hamza nova* Rev. (7000-8000)

I might add that on May 12, 1940, I also took nine day-flying moth species and 5 lepidopterous species as larvæ.

The total number of butterflies for the province of Fars, given by BRANDT (1938), was 85. There are in fact at least four more than this in the province and the total is probably 90 or more. Of these, however, about 20 occur very much higher and about 80 miles north of Shiraz or very much lower and about 50 miles west of Shiraz and must be ruled out as not inhabiting the Shiraz district. The proportion therefore of species taken in one day to the total butterfly fauna of the same district is 31/70 or about 2/5, almost exactly the same as that reported by Mr. HEMMING from Digne (56/135).

I have said that if one goes outside the Shiraz district I think there are about 90 butterfly species in Fars. This is less than the 134 species recorded from the Lebanon by ELLISON and myself (1939); and the Elburz range in N. Persia must have a total even exceeding that of the Lebanon, considering that it contains two quite different climatic areas, therein differing from other parts of the Middle East which I know. I find however that in my excursions in the Lebanon and Elburz I failed, for various reasons, to exceed the total achieved on Kuh Barfi. A great deal depends on one's object on any given excursion, and for this reason the fraction 2/5ths may not have much significance.

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BOG COLLECTING IN CENTRAL MAINE

by LIONEL PAUL GREY

The sphagnum-heath bogs in central Maine provide richer collecting than do the scattered pockets found elsewhere in New England, for here such bogs often are large in size and remain as undisturbed wilderness areas. It is incredible how rapidly they are vanishing; during boyhood I roved many an open bog which now is choked densely with young growth. Also there are many hundreds of acres here, now heavily forested but with the telltale plant vestiges and traces of a sphagnum rim attesting that only yesterday these, too, were bogs. Our forty-odd inches of annual rainfall seem insufficient either to explain or to maintain our extensive lakes, and since a bog requires a surfacing of the underground water table, these retreating bogs also bear mute witness of how largely we in New England have been living on a gift of glacially outpoured waters now dwindling away. In my youth the bogs were wet all summer, but now even in abnormally wet years one can pass through most of them dry-shod, after the spring run-off.

A nostalgic marker of rapidly changing times and one I now miss in the remaining open bogs are the gaunt skeletons of the old larch, now mostly fallen; these spoke of an earlier page in history when these trees were of much economic value, the boles and dug-out main roots furnishing the "juniper knees" to frame the tall clipper ships built along our coast. Also, there is the curious reflection that the tiny insects, the casebearers and sawflies which abruptly destroyed the primeval larch rims around these bogs, were rather directly the cause of the retreat of the caribou, and, with them, the wolves, for the caribou depended on larch for winter browse. Despise not the lowly "bug"!

Having been asked for notes regarding the well-known Passadumkeag Bog region near my home, I have a melancholy duty to report that collecting there has deteriorated greatly during the past quarter-century although remaining worthwhile from the point that here are accessible roadside areas where even the oldsters may enjoy thrills of bog collecting without undue exertion or discomfort. In general, the best places now require strenuous trips, or, even if near the roads, as in the instance of the famous "Dead Stream Bog," would be unsafe to venture into. Bogs and burned lands are, of all places, to be shunned by the uninitiated; even a compass is useless to an inexperienced or bewildered man; woodsmen rely more on land contours.

In the past I have guided visiting entomologists into the nearby bogs, and as long as I remain here I shall continue to be delighted with any prospect of having companions on weekend jaunts, given due notice. But if I were not available, the geodetic topographic maps are very detailed and the ordinary road maps sufficient to locate the places hereinafter described, with a bit of inquiry.

The town of Lincoln, fifty miles north of Bangor on U.S. Route Two, is a logical headquarters. From there, the best roadside spots are about fifteen miles south, proceeding first to Enfield and thence southwest toward Passadumkeag on a backwoods road which forks about two miles below Enfield. The left-hand fork swings steeply up on to a horseback ridge; this is known as the Gould's Ridge Road, from which may be had a tremendous panorama of meadowland on the left, which is rather barren as a collecting ground. There is some chance of fair roadside collecting and the drive is especially recommended both for the striking wilderness views and because this horseback is a particularly famous one, often mentioned in geology texts as a classic example of an esker, a formerly ice-walled glacial stream bed. But it is just where the road forks that the visitor had best leave his car and explore the bog on the west side of the highway. Early in June, a trip around the rim tangle is almost certain to result in flushing a few *Œneis jutta* Hübner, this being the most productive known colony, one which perhaps has yielded more material than all other northeastern localities combined. In mid-July this same bog is the best place I know for *Lycæna epixanthe* transitional to *phædrus* Hall, best collected late in the afternoon. This is an exceptionally fine bog, complete with a small pond "eye." Collecting may be done here safely, if not in comfort; those whose interests include the small biting insects can have a real field day.

The right fork runs direct to Passadumkeag, first through low forest growth and then through partly grown-in bogs; this is the "Old Caribou Road" which in earlier days often was impassable except with a high-axle car but now has been much "improved" so that the roadside collecting has nearly perished, as it always seems to do before the crunching bulldozer and the rumbling asphalt truck. This, added to narrowing in of the bogs, plus the extensive pulpwood operations which have mangled the forest, now leaves only forlorn traces of what once was a veritable woodland paradise. The endemic species still remain, but now put on a feeble show compared to the earlier grandeurs; it might even be termed fair collecting yet, the difference being that one must hope only for short series whereas formerly there was such an abundance of many choice things that the net seldom was idle.

The rarer moths, particularly the day-flying noctuids have been scarce in late years, but this whole area still remains extremely productive for general moth collecting. The State of Maine forest insect program maintains numerous trap stations, widely scattered, and the one at Enfield usually yields the most extensive and varied material. On suitable nights the ordinary funnel-type light traps work unattended to bring in moths quite literally by the quart, and in surprisingly excellent condition.

Collectors familiar with northeastern collecting will appreciate that it is futile here to attempt to say just what will be taken and just where to go; we never know that, ourselves, but put in our days tramping and exploring. The numerous places we visit for special things often are areas the size of a kitchen floor, so to speak, and quite useless to detail, for who else could find them? But the law of averages will work for the collector patient and assiduous enough to keep slogging.

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RECENT LITERATURE ON LEPIDOPTERA

(Under the supervision of Peter F. Bellinger)

Under this heading are included abstracts of papers and books of interest to lepidopterists. The world's literature is searched systematically, and it is intended that every work on Lepidoptera published after 1946 will be noticed here; omissions of papers more than 3 or 4 years old should be called to Dr. Bellinger's attention. New genera and higher categories are shown in CAPITALS, with types in parentheses; new species and subspecies are noted, with type localities if given in print. Larval foodplants are usually listed. Critical comments by abstractors may be made. Papers of only local interest and papers from *The Lepidopterists' News* are listed without abstract. Readers, particularly outside of North America, interested in assisting with this very large task, are invited to write Dr. Bellinger (Osborn Zoological Lab., Yale University, New Haven 11, Conn., U. S. A.) Abstractors' initials are as follows: [P.B.] — P. F. Bellinger; [I.C.] — I. F. B. Common; [W.C.] — W. C. Cook; [A.D.] — A. Diakonoff; [W.H.] — W. Hackman; [J.M.] — J. Moucha; [E.M.] — E. G. Munroe; [N.O.] — N. S. Obraztsov; [C.R.] — C. L. Remington; [J.T.] — J. W. Tilden; [P.V.] — P. E. L. Viette.

B. SYSTEMATICS AND NOMENCLATURE

Bauer, David L., "A new race of *Papilio indra* from the Grand Canyon region." *Lepid. News,* vol.9: pp.49-54, 1 pl. 10 Aug. 1955. Describes as new *P. i. kaibabensis* (Bright Angel Point, Ariz.)

Bell, Ernest Layton, & Cyril Franklin dos Passos, "The lectotype of *Megathymus aryxna* Dyar (Lepidoptera, Megathymidæ)." *Amer. Mus. Novit.,* no.1700: 5 pp. 20 Dec. 1954. Identified as specimen figured in *Biologia Centrali-Americana,* vol.3, pl.69, fig.4. [P.B.]

Berger, L. A., "Note sur *Papilio jacksoni* Sharpe" [in French]. *Lambillionea,* vol.54: pp.92-93. 25 Dec. 1954. Describes as new *P. j. hecqi* (Kibali-Inturi, Belgian Congo); note on this species of eastern and central Africa. [P.V.]

Bernardi, G., "Revision de *Belenois gidica* God. d'Ethiopie (Lep. Pieridæ)" [in French]. *Rev. franç. Lépid.,* vol.15: pp.13-20, 1 pl. July 1955. Study of the subspecies *B. g. hypoxantha* and *B. g. abyssinica.* Designates a lectotype for the latter; this subspecies has distinct dry- and wet-season forms. [P.V.]

van den Bosch, R., & Ray F. Smith, "A taxonomic and distributional study of the species of *Prodenia* occurring in California." *Pan-Pac. Ent.,* vol.31: pp.21-28. 1955. *P. præfica* and *P. ornithogalli* both occur in California, the latter only south of the Tehachapi Mts. *P. præfica* has a diapause in the pupal state. *P. ornithogalli* has no diapause and is unable to endure cold winters. [J.T.]

Boursin, Ch., "Description de deux genres nouveaux (Lep. Phal.) (Contributions à l'étude des "Agrotidæ" — Trifinæ, LXII)" [in French]. *Bull. Mens. Soc. Linn. Lyon,* vol.24: pp.219-220. Nov. 1955. Describes as new two genera of Phalænidæ (=Agrotidæ, =Noctuidæ): *AMMOPOLIA* (type *witzenmanni* Stdf.) and *BRYONYCTA* (type *pineti* Stgr.). [P.V.]

Box, Harold E., & Hahn W. Capps, "New crambine genera allied to *Diatræa* Guilding (Lepidoptera: Pyralidæ). I (supplementary note) and II." *Proc. Roy. Ent. Soc. London (B),* vol.24: pp.174-178, 1 pl., 1 fig. 31 Oct. 1955. Revises description of *Eodiatræa* and *E. centralis.* Describes as new *CRAMBIDIATRÆA* (type *D. cayenella*), including also *D. strigipenella, D. castrensis, D. entreriana.* Figures type specimens of 4 spp. of *Diatræa* (s.l.). [P.B.]

Brown, F. Martin, "Studies of Nearctic *Cœnonympha tullia* (Rhopalocera, Satyridæ). *Cœnonympha tullia inornata* Edwards." *Bull. Amer. Mus. Nat. Hist.,* vol.105: pp.359-410, 2 pls., 19 figs. 14 March 1955. Divides Nearctic *C. tullia* into 5 groups centered around the names *inornata, ochracea, california, ampelos, mixturata.* Study of variation in the races *C. i. mcisaaci, C. i. nipisiquit, C. i. inornata* (including *quebecensis*) and *C. i. benjamini* (for the purpose of this work *tullia* is treated as a superspecies and *inornata* as a species). Also gives available information on habits and ecology; repeats original descriptions and locates types; figures these 4 races and representatives of other American groups. [P.B.]

Cary, Margaret M., "Name changes for the Sphingidæ of Jamaica." *Lepid. News,* vol.9: pp.135-136. 22 Dec. 1955.

Clarke, J. F. Gates, "The correct name for a pest of cacao." *Proc. Ent. Soc. Washington,* vol.56: pp.266-267. Oct. 1954. *Zetesima baliandra* correct name for *A. theobromæ* (Stenomidæ). [W.C.]

Clarke, J. F. Gates, "The correct name for a pest of legumes." *Proc. Ent. Soc. Washington,* vol.56: pp.309-310. 1954. *Epinotia aporema* the correct name for *E. opposita* (Olethreutidæ). [W.C.]

Ford, E. B., "Polymorphism and taxonomy." *Heredity,* vol.9: pp.255-264. Aug. 1955. Reprinted from *Rpt. 7th N. Z. Sci. Congr., 1951.*

Freeman, H. A., "Four new species of *Megathymus* (Lepidoptera, Rhopalocera, Megathymidæ)." *Amer. Mus. Novit.,* no.1711: 20 pp., 34 figs. 11 March 1955 Describes as new *M. harrisi* (Stone Mt., Ga.; on *Yucca filamentosa*); *M. belli* (La Bequilla, Durango, Mex.); *M. mcalpinei* (5 mi. N. of Marathon, Tex.; on undescribed *Agave*); *M. maculosus* (Kingsville, Tex., on *Manfreda maculosa*). Other foodplant records are: *M. cofaqui* (*Yucca aloifolia*); *M. chisosensis* (*Agave scabra;* previous record incorrect). [P.B.]

Grotenfelt, P., & W. Hackman, "*Hydrœcia nordstroemi* Horke found in Finland." *Notul. Ent.,* vol.33: pp. 82-84, 4 figs. 1953. The ♂ and ♀ genitalia of *H. nordstroemi* and *H. micacea* are figured. [W.H.]

Hessel, Sidney A., "A natural Cynthia-Cecropia mating." *Lepid. News,* vol.9: p.142. 22 Dec. 1955.

Hovanitz, W., "*Colias nastes* and *Colias hecla* from Meade River, Alaska." *Wasmann Journ. Biol.,* vol.13: pp.1-8. 1955. Describes as new *C. nastes thula* (near Meade R., Alaska). [J.T.]

Issekutz, László, "*Monima schmidtii* Diósz (Lepid., Noctuidæ)" [in English, Hungarian summary]. *Ann. Hist.-Nat. Mus. Nat. Hung.,* n.s., vol.6: pp.321-325, 6 figs. 1955. Redescribes species and describes genitalia. [P.B.]

Kaisila, J., & O. Peltonen, "*Philotes vicrama* Moore (Lep., Lycænidæ) in Finnland" [in German]. *Ann. Ent. Fennici,* vol.21: pp.9-12, 3 figs. 1955. All the Finnish records of *P. baton* are erroneous; the specimens all belond to P. *vicrama schiffermuelleri.* Parts of the ♂ genitalia of both species are figured. All known Finnish finds of *P. vicrama* are listed. [W.H.]

Keen, F. P., "Correct identity of the Douglas-fir cone moth." *Journ. Econ. Ent.,* vol.46: p.1107. "Dec. 1953" [10 March 1954]. This serious pest of western Douglas Fir, which has been called *Cydia pseudotsugana* in the economic literature for many years, is not this species, which is shown to defoliate larch and firs but is not a cone borer. The cone borer is actually *Barbara colfaxiana.* [W.C.]

Krogerus, H., "Investigations on the Lepidoptera of Newfoundland. I. Macrolepidoptera." *Acta Zool. Fennica,* vol.82: pp.1-80, 34 figs., 1 map. 1954. Describes as new: *Protorthodes lindrothi; Hydrelia terræ-novæ.* Contains a check list of all Macrolepidoptera known from Newfoundland. Compares closely allied species of Newfoundland and Europe. The ♂ genitalia of 34 spp. and sspp. are figured. Gives a detailed survey of the localities for each species based on extensive material collected by the author and other members of the Finnish-Swedish Expedition to Newfoundland, 1949. [W.H.]

Mickel, Clarence E., "Some milestones in the history of insect classification." *Canad. Ent.*, vol.87: pp.57-66. 15 March 1955. Discusses Aristotle, Gesner, Aldrovandus, Swammerdam, Ray, Linnæus, Fabricius, Latreille, and Darwin. [E.M.]

Munroe, Eugene, "The genus *Epipagis* Hübner, *nec* Hampson, in North America (Lepidoptera: Pyralidæ)." *Canad. Ent.,* vol.87: pp.-249-252, 6 figs. 5 Aug. 1955. Describes as new *E. forsythæ* (Florida). Records *E. disparilis* from the U. S. (Ariz.). Sinks *Stenophyes* to *Epipagis,* and synonymizes *E. fenestralis* with *huronalis,* but retains the latter name under the principle of conservation. Photographs of moths, descriptions of genitalia. [E.M.]

Povolný, Dalibor, & Jiří Šmelhaus, "Nový přispěvek k poznáni rodu *Procris* Fabr. [Contribution to the knowledge of the genus *Procris* Fabr.]" [in English, Czech introduction] *Acta Soc. Zool. Bohemoslovaciæ,* vol.15: pp.147-200, 29 figs., 3 maps, 169 figs. of genitalia. 1951. Very important study of morphology, phylogeny, and systematics of *Procris.* Describes as new subgenus *GREGORITA,* for *P. soror* (=*hispanica*). [J.M.]

do Rego Barros, Alfredo Rei, "Fauna do Distrito Federal. XIV. Sôbre uma especie do gênero *Cresera* Schaus, 1894 (Lepidoptera-Heterocera)" [in Portuguese]. *Bol. Mus. Nac. Rio de Janeiro,* ser.2, no.124: 17pp., 2 pls., 6 figs. 29 Oct. 1954. Detailed redescription of *C. perflua* (Arctiidæ); figures adults, genitalia and other structures. [P.B.]

Roubal, Jan, "K článku, 'Nomenclator sive enumeratio critica Lepidopterorum Slovaciæ (Satyridæ-Sphingidæ). Auctore J. Paclt' v tomto časopise XII, 1949, pp.140-155" [in

Czech]. *Folia Ent.,* vol.13: p.48. 30 April 1950. Gives some Slovak names of Lycænidæ. [J. M.]

Todd, E. L., "The distribution and nomenclature of the Corn Earworm." *Journ. Econ. Ent.,* vol.48: pp.600-603, 2 figs. Oct. 1955. The Corn Earworm is not *Heliothis armigera,* which does not occur in North America, and cannot be called *obsoleta,* which is preoccupied. Correct name is *H. zea.* Genitalia of *zea* and of *gelotopoeon,* a closely related species from South America, are figured. [W.C.]

Todd, E. L., "The recognition of species of *Dichordophora* Prout." *Proc. Ent. Soc. Washington,* vol.57; pp.118-120, 6 figs. June 1955. Discusses the separation of *D. phœnix* and *D. aplagaria.* Figures ♂ and ♂ genitalia of these and of *iridaria.* Also gives characters to separate *Dichordophora* from *Dichorda* (Geometridæ). [W.C.]

Todd, E. L., "The separation of the adults of *Acontia dacia* Druce from related species." *Journ. Econ. Ent.,* vol.48: pp.599-600, 8 figs. Oct. 1955. Distinguishing characters are given to separate *dacia* from *terminimacula,* and both of these from other related *Acontia.* Photos of maculation and drawings of ♂ and ♀ genitalia. [W.C.]

de Toulgoet, H., "Description d'Arctiidæ nouveaux de Madagascar et des Comores (3e note)" [in French]. *Rev. franç. Ent.,* vol. 22: pp.186-202, 13 figs. 1 pl. Oct. 1955. Describes as new: *Eilema phantasma, E. croceibasis, E. quadrangula, E. simulatricula, E. pauliani* (S. Madagascar); *E. decaryi, Philenora tortricodes* (Madagascar); *P. pseudotortrix, P. rotunda* (central Madagascar); *P. proxima, P. andriai* (S.W. Madagascar); *P. arida, Roeselia decaryi* (far south Madagascar); *Eilema comorensis* (Moheli, Comoro Is.); *BRYONOLA* (type *parmelia* Tlgt.). [P.V.]

Viette, P. E. L., "Notodontidæ de Madagascar nouveaux ou peu connus" [in French]. *Bull. Mens. Soc. Linn. Lyon,* vol.24: pp.221-228. Nov. 1955. New or little known spp. from the E. Madagascar rain forest. Describes as new: *Desmeocræra antongilensis, D. miata, Chadisra malgassa, Tricholoba magnifica, Onophalera simplex, Turnacoides ioptila, Dinotodonta nigripunctella, Eurystaura euryala, Eutrotonotus psilodoxa, Anaphe mirabilis.* [P.V.]

C. MORPHOLOGY AND CYTOLOGY

Eastham, L. E. S., & Y. E. E. Eassa, "The feeding mechanism of the butterfly *Pieris brassicæ* L." *Phil. Trans. Roy. Soc. London B,* vol. 659: pp.1-43, 44 figs. 1 March 1955. A very detailed description of the morphology and method of functioning of the proboscis and the other head structures involved in feeding. [P.B.]

Finlayson, L. H., & Otto Lowenstein, "A proprioceptor in the body musculature of Lepidoptera." *Nature,* vol.176: p.1031. 26 March 1955. Modified muscle cells in dorsal longitudinal musculature of saturniid larvæ. [P.B.]

D. VARIATION AND GENETICS

Averkiev, I. S., "Deriving a new variety of Tussah Silkworm (*Antheræa pernyi*) by changing feeding conditions" [in Russian]. *Dokl. Vses. Akad. Sel'sk. Nauk im. Lenina,* vol.17, no.8: pp.37-39. 1952. [Not seen.]

Biezanko, C. M., "Sôbre algumas novas aberracoes de *Colias lesbia pyrrhothea Hübn.,* 1823" [in Portuguese]. *Agros,* vol.2, no.2: 4 pp., 1 pl. 1949. Describes, figures, and names 8 aberrations of *C. l. pyrrhothea.* [C.R.]

Brůčková, Bozena, "Sur la variabilité de *Amphidasis betularia* L. en Bohême" [in Czech, French summary]. *Acta. Ent. Mus. Nat. Pragæ,* vol.26, no.356: 4 pp. 8 Oct. 1951. Lists all forms of this sp. recorded from Bohemia and describes a form from this area, without location or figures. [J.M.]

Brůčková, Bozena, "Sur les espèces du genre *Pœcilopsis* Harrison de Bohême" [in Czech, French summary]. *Acta Ent. Mus. Nat. Pragæ,* vol.26, no.365: 5 pp. 9 Oct. 1951. The distribution of *P. isabellæ* and *P. pomonaria* in central Europe is discussed and two forms of *P. isabellæ* are described and named, from Bohemia and Poland. [J.M.]

Brůčková, Bozena, "Study of the Bohemian species of the genus *Erannis* Hübner (Geom.)." *Acta Ent. Mus. Nat. Pragæ,* vol.27: pp.213-221. 1952. Records 5 spp. of this genus from Bohemia and gives their distribution and variability. [J.M.]

Clarke, C. A., & P. M. Sheppard, "The breeding in captivity of the hybrid *Papilio rutulus* female × *Papilio glaucus* male." *Lepid. News,* vol.9: pp.46-48, 1 fig. 10 Aug. 1955.

Dufay, C., "Une forme nouvelle de *Lithosia quadra* L." [in French]. *Rev. franç. Lépid.,* vol.14: pp.259-260, 3 figs. March 1955. A new form of *L. quadra* in the Alps. [P.V.]

Hrubý, Karel, "Colour variation in *Dendrolimus pini* L. (Lasiocamp.)" [in Czech, English summary]. *Acta Soc. Ent. Čechosloveniæ,* vol.48: pp.127-131. 30 Nov. 1951. The color of caterpillars is independent of the color of the imago. [J.M.]

Kettlewell, H. B. D., "Recognition of appropriate backgrounds by the pale and black phases of Lepidoptera." *Nature,* vol.175: pp.943-944. 28 May 1955. Reports experiment demonstrating tendency of color forms of *Biston betularia* to rest on backgrounds on which they are inconspicious. This supports the theory that industrial melanism is an adaptive phenomenon related to the general darkening of available backgrounds by soot. [P.B.]

Komárek, Oldřich, "Contribution à la connaissance de *Zygæna carniolica* Scop. en Bohême" [in Czech; Russian and French summaries]. *Acta Soc. Ent. Čechosloveniæ,* vol.49: pp.146-153, 1 map. 15 Dec. 1952.

Komárek, Oldřich, "La variabilité de l'espèce *Zygæna carniolica* Scop. en Bohême (Lep. Zygænidæ)" [in Czech; Russian and French summaries]. *Acta Soc. Ent. Čechosloveniæ,* vol.49: pp.200-212, 10 figs. 15 Dec. 1952. In both papers discusses the variability of *Z. carniolica* from N. E. Bohemia. [J.M.]

Milyaev, A. P., "Methods of changing the nature of the Oak Silkworm" [in Russian]. *Priroda,* vol.39, no.2: pp.7-15. Feb. 1950. [Not seen.]

Müller, H. J., "Die Saisonformbildung von *Araschnia levana,* ein photoperiodisch gesteuerter Diapause-Effekt" [in German]. *Naturwissenschaften,* vol.42: pp.134-135, 1 fig. March 1955. Larvæ raised at day length of 16-20 hours produced adults of summer form "prorsa"; larvæ raised at day length of 8 hours produced, after prolonged diapause, adults of spring form "levana"; temperature was ruled out as a factor in producing these seasonal forms. [P.B.]

Ostriakova-Varshaver, V. N., & B. L. Astaurov, "Hereditary variability in liability of the silkworm (*Bombyx mori*) to androgenesis under the influence of temperature" [in Russian]. *Dokl. Akad. Nauk SSSR,* vol.58: pp.2131-2134, 1 fig. 1947. [Not seen].

Povolný, Dal., "The causes of melanism in Lepidoptera" [in Czech; English summary]. *Folia Ent.,* vol.11: pp.141-143. 31 Oct. 1948.

Slabý, Otto, "Le problème du dimorphisme sexuelle de l'espèce *Xylomania conspicillaris* L. et l'apparition de sa forme typique dans la Bohême de l'ouest (Noctuidæ)" [in Czech; French summary]. *Acta Soc. Ent. Čechosloveniæ,* vol.48: pp.187-190, 2 figs. 15 Dec. 1951. The f. "intermedia" Tutt probably only nominate form of ♀. [J.M.]

Strunnikov, V. A., "Increasing the viability of the silkworm by crossing individuals of different weight" [in Russian]. *Dokl. Vses. Akad. Sel'sk. Nauk im. Lenina,* vol.18, no.6: pp.32-34. 1953. [Not seen.]

Tanaka, Yoshimaro, "Is there any cytoplasmic effect on unstable genes in the Silkworm?" *Nat. Inst. Genetics (Japan), Ann. Rept.,* no.3: pp.17-19, 1 fig. 1953. Variability of larval spotting greater in F_1 or F_2 when mother was normal than in reciprocal; more data being gathered. [C.R.]

Tanaka, Yoshimaro, "Spontaneous recurrent mutations of a modifier of the Multistar marker." *Nat. Inst. Genetics (Japan), Ann. Rept.,* no.3: pp.19-20. 1953. Larval color form appeared in long inbred line of *Bombyx mori* and then recurred in later generations bred from normal parents. May be tendency for recurrent mutations or assembled polygenes. [C.R.]

Tsujita, Mitsuo, "Studies on the semi-allelic E-series in the Silkworm. (a) On the relation between E^{H} and E^{Kp}. (b) [with Bungo Sakagunchi] On the relation between E^{Ms} and E^{Mc}" *Nat. Inst. Genetics (Japan), Ann .Rept.,* no.3: pp.20-22, 1 fig., 22-24, 2 figs. 1953. Larval genes E^{H} (extra spots on abd. seg. 4) and E^{Kp} (extra abd. legs) shown not to be allelic, although very close together; these cross over in female (!) as well as male. E^{Ms} and E^{Mc} (extra-leg genes) are also found not to be allelic. [C.R.]

Tsujita, Mitsuo, "Maternal inheritance of 'Lethal Yellow'." *Nat. Inst. Genetics (Japan), Ann. Rept.,* no.3: pp.24-27, 1 fig. 1953. In *Bombyx mori,* finds that mother controls color of egg and young larva, regardless of father's genotype. [C.R.]

Tsujita, Mitsuo, & Bungo Sakaguchi, "Genetical and biochemical studies of Yellow Lethal larvæ." *Nat. Inst. Genetics (Japan), Ann. Rept.,* no.3: pp.27-28. 1953. Find that Yellow Lethals (of *Bombyx mori*) have more xanthopterin-B and methionine and less isoxanthopterin than normals. [C.R.]

Tsujita, Mitsuo, "Trisomic Silkworm produced by treatment with BHC powder." *Nat. Inst. Genetics (Japan), Ann. Rept.,* no.3: pp.28-32, 11 tables. 1953. Discusses unexpected recombinations in crosses between trisomics and normals. [C.R.]

Yosida, Tosihide H., "Cytological study on the racial hybrids of *Philosamia cynthia* (Lepidoptera, Saturniidæ)." *Nat. Inst. Genetics (Japan), Ann. Rept.,* no.3: pp.34-35. 1953. Chromosome number of *P. c. walkeri* (Manchuria and Korea) is $n = 13$, of *P. c. pryeri* (Kyushu) and *P. c. ricini* (Formosa?) is $n = 14$. All *walkeri* × *pryeri* and *walkeri* × *ricini* hybrids show 12 bivalents and one trivalent, except Manchurian *walkeri* × *pryeri* which shows 10 bivalent, 1 trivalent, 1 quadrivalent. "Racial" differentiation probably due to duplication of one chromosome pair; Manchurian and Korean races of *walkeri* differ in a reciprocal translocation, with *pryeri* having the Manchurian type and *ricini* having the Korean type. No *pryeri* × *ricini* crosses reported. [C.R.]

E. DISTRIBUTION AND PHENOLOGY

Kudla, Mil., "Výskyt můry *Chariclea delphinii* L. u Olomouce" [in Czech]. *Acta Soc. Ent. Čechosloveniæ,* vol.49: pp.88-89. 1 Oct. 1952. Gives information about *C. delphinii* captured near Olomouc (central Moravia). [J.M.]

de Laever, E., "Notes sur le genre *Cosymbia* Hübner" [in French]. *Lambillionea,* vol.54: pp.35-39. 25 Aug. 1954. Notes on the geographical repartition, genitalia and biology of the Belgian and French species of *Cosymbia* (Geometridæ). [P.V.]

de Laever, E., "*Tomares ballus* Fabr. dans les Basses-Alpes" [in French]. *Rev. franç. Lépid.,* vol.14: p.165. Nov. 1954. Capture of *T. ballus* (Lycænidæ) in the South Alps. [P.V.]

de Lajonquière, Y., "*Cerura verbasci* F. et quelques autres captures en Ardèche" [in French]. *Rev. franç. Lépid.,* vol.14: pp.193-194. Nov. 1954. New localities for *C verbasci* (Notodontidæ) and list of interesting species collected in Ardèche area. [P.V.]

Leleux, "Quelques noctuelles intéressantes du Jura" [in French]. *Rev. franç. Lépid.,* vol.14: pp.195-196. Nov. 1954. List of some interesting species of Noctuidæ from the Jura Mts. [P.V.]

Martin, P., "Lépidoptères nouveaux pour la région de Genève 1948-1954" [in French]. *Mitt. Schweiz. Ent. Ges.,* vol.28: pp.149-152. April 1955. List of new captures of Lepidoptera in the Geneva area in these years. [P.V.]

Menu, J.-J., "*Papilio podalirius* dans le Nord" [in French]. *Rev. franç. Lépid.,* vol.14: p.166. Nov. 1954. Capture of *P. podalirius* in the North of France. [P.V.]

Moucha, Josef, "*Argynnis laodice* Pall. en Tchécoslovaquie" [in Czech; French summary]. *Acta Soc. Ent. Čechosloveniæ,* vol.48: pp.135-137. 30 Nov. 1951. Czechoslovakian records and description of the locality in Vihorlat Mts. (eastern Slovakia). [J.M.]

Moucha, Josef, "Contribution à la connaissance de la distribution géographique du papillon *Leptidea morsei* Fent. ssp. *major* Lork." [in Czech; French summary]. *Acta Soc. Ent. Čechosloveniæ,* vol.48: pp.181-186, 4 figs. 15 Dec. 1951. Lists all localities from central Europe. [J.M.]

Moucha, Josef, "Fragmenta lepidopterologica" [in Czech, English summary]. *Acta Soc. Ent. Čechosloveniæ,* vol.48: pp.238-240. 31 Dec. 1951. Records *Epizeuxis calvaria* from central Bohemia and the mass occurrence of *Lymantria dispar* and *Hyphantria cunea* in South Slovakia. [J.M.]

Moucha, Josef, "The distribution of *Pandoriana maja* Cr. in Central Europe (Lep. Nymphalidæ)." *Acta Ent. Mus. Nat. Pragæ,* vol.27: pp.69-88, 2 figs., 1 map. 1952. Gives distribution in Central and Southeastern Europe with bibliography. Both sexes of the nominate form from Turkey (Therapia, near Istanbul) are figured. [J.M.]

Moucha, Josef, "Insecta Houškeana" [in English, Czech & Russian summaries]. *Acta Ent. Mus. Nat. Pragæ,* vol.28: pp.185-207. 1953. Systematic and faunistic study of Lepidoptera collected by J. Houška in Palestine (1940-1946). Recorded are 62 spp. [J.M.]

Moucha, Josef, "La distribution géographique de la *Leptidea morsei* Fent. en Europe (Lep. Pieridæ)" [in French]. *Bull. Soc. Ent. Mulhouse* 1953: pp.1-4, 11 figs. Jan. 1953. Lists all known localities for *L. morsei major,* the European race; compares it to *L. sinapis,* figuring both. [P.B.]

Nemček, Stanislav, "Príspevok k doterajším poznatkom motýlov Chočského pohoria (Slovensko)" [in Slovak; Russian summary]. *Acta Soc. Ent. Čechosloveniæ,* vol.50: pp.53-55. 20 Jan. 1954. Lists 43 spp. of Rhopalocera & Hesperiidæ from Chočské pohorie Mts. (N.W. Slovakia). [J.M.]

Newman, L. Hugh, "Reported British butterflies." *Country Life,* vol.110: pp.658-659, 6 figs. 31 Aug. 1951. Account of some species dubiously recorded in Britain, and some occasional immigrants; good figures of adults. [P.B.]

Newman, L. Hugh, "Butterflies yesterday and today — I. Species on the decline. II. Five species on the increase." *Country Life,* vol.115: pp.1708-1709, 2013-2014, 12 figs. 27 May, 7 June 1954. British species; good figures.

Overlaet, F. G., "Les races géographiques de *Cymothoe sangaris* Godart et ses formes voisines" [in French]. *Bull. Ann. Soc. Ent. Belg.,* vol.90: pp.150-156, 1 map, addendum pp.156-157. 30 June 1954. Study of the geographical races of *C. sangaris* and related species in West and Central Africa: *C. s. sangaris,* Guinea; *C. s. uselda,* N. Belgian Congo; *C. s. magnus,* Stanleyville & Kivu; *C. s. rubrior,* French Congo & center of Belgian Congo; *C. s. luluana,* S. W. Katanga; *C. h. hobarti* Uganda, Nandi; *C. h. mwamikazi,* Kivu, Kibali-Ituri; *C. h. candidata,* Uele; *C. e. euthaliodes,* Cameroons; *C. e. albomarginata,* Sierra Leone. [P.V.]

Paclt, Jiří, "Fragmenta lepidopterologica. 3ᵉ note. Contribution á la distribution géographique d'un Geometridæ" [in Czech; French summary]. *Folia Ent.*, vol.12: pp.61-65, 1 map. 1949. Records localities of *Eupithecia sinuosaria* in Czechoslovakia. [J.M.]

Patočka, Jan, "Notes écologiques sur les noctuids du genre *Tæniocampa*. La dévastation produite par le complexe des chenilles" [in Czech; French summary]. *Folia Ent.*, vol.13: pp.41-45. 30 April 1950. Mass occurrence of *Tæniocampa* spp. in South Slovakia and control by DDT. [J.M.]

Pausar, Filip, "Výskyt *Carpocapsa pomonella* L. v Jihlavé v letech 1947 a 1948" [in Czech; English summary]. *Folia Ent.*, vol.12: pp.130-138, 5 figs. 1949. Gives data on the mass occurrence of *C. pomonella* in Jihlava (Moravia). [J.M.]

Povolný, D., "O invasi *Phytometra zosimi* Hbn. (Plusiinæ) na území ČSR" [in Czech]. *Folia Zool. Ent.*, vol.3: p.190. Sept. 1954. Records the sp. from southern Slovakia. [J.M.]

Povolný, D., & F. Gregor, "Contributions to the knowledge of the Lepidoptera of Jeseníky Mountains I" [in Czech; English summary]. *Folia. Ent.*, vol.10: pp.87-93. 30 Sept. 1947. Lepidoptera of the peatbogs in the environs of Rejvíz in Silesia. 5 spp. listed as new for the area. [J.M.]

Povolný, D., & F. Gregor, "Some interesting notes on Moravian Lepidoptera" [in Czech; English summary]. *Folia Ent.*, vol.11: pp.15-17. 30 April 1948. 9 spp. are recorded; *Erastria obliterata* new for Czechoslovakia. [J.M.]

Povolný, D., & F. Gregor, "Pátý příspěvek k fauně motylů ČSR" [in Czech; Russian summary]. *Acta Soc. Ent. Čechoslovenicæ*, vol.49: pp.237-239, 4 figs. 15 Dec. 1952. Record of 17 spp. (4 new to Czechoslovakia). [J.M.]

Pujman, Dušan, "Nejsevernějsi nalezistě vřetenusky *Zygæna læta* Hbn. v Čechách (Lep. Zygænidæ)" [in Czech]. *Acta Soc. Ent. Čechoslovenicæ*, vol.49: pp.212-213. 15 Dec. 1952. Northernmost locality of *Z. læta* in Bohemia. [J.M.]

Rahm, U., "La Côte d'Ivoire. Centre de recherches tropicales" [in French]. *Acta Tropica*, vol.11: pp.222-295, 30 figs. 1954. Describes the types of forest and savanna in the Ivory Coast; gives a general account of botany, zoology, and anthropology, listing other animals some representative Lepidoptera (chiefly butterflies). [P.B.]

Shakhbazov, V. G., "The Usshuri oak silkworn in the Maritime Territory" [in Russian]. *Dokl. Vses. Akad. Sel'skokh. Nauk*, vol.15, no.1: pp.36-40. 1949. [Not seen.]

Slabý, Otto, "Concerning the dependence of the Lepidoptera fauna of Bohemia on climatic cycles" [in Czech, English summary]. *Acta Soc. Ent. Čechoslovenicæ*, vol.48: pp.242-253, 2 graphs. 31 Dec. 1951.

Slabý, Otto, "Sur la répartition verticale de l'espèce *Parnassius apollo* (L.) dans les Carpathes de la Slovaquie" [in Czech; Russian & French summaries]. *Acta Soc. Ent. Čechoslovenicæ*, vol.49: pp.189-200. 15 Dec. 1952. In Slovakia *P. apollo* lives at about 350-1600 m. above sea level. Gives some remarks about its bionomy. [J.M.]

Slabý, Otto, "Ueber neue Fundorte der *Zygæna brizæ* Esp. im slowakischen Karpathengebiete und über ihr Verbreiten in neue Areale (Zygænidæ)" [in Czech; Russian & German summaries]. *Acta Soc. Ent. Čechoslovenicæ*, vol.50: pp.67-77. 20 Jan. 1954. Gives distribution of *Z. brizæ* in Slovak Carpathians; describes and names aberration. [J.M.]

Smelhaus, Jiří, "*Cupido decoloratus* (Stdgr.) et *C. alcetas* (Hffgg.) dans la Tchécoslovaquie" [in Czech]. *Folia Ent.*, vol.12: pp.41-43. 1949. Gives localities in Czechoslovakia and characteristics of these spp. [J.M.]

Treat, Asher E., "*Acentropus niveus* in Massachusetts, remote from water." *Lepid. News*, vol.8: pp.23-24. 25 June 1954.

Troníček, Edvard, "Quelques espèces de papillons nouvelles pour la Bohême du Bassin Central de l'Elbe" [in Czech; French summary]. *Acta Soc. Ent. Čechoslovenicæ*, vol.48: pp.191-197. 15 Dec. 1951. Describes the field biotope in central Bohemia and lists 4 spp. new for the country (*Thaumatopœa pinivora, Porphyrinia purpurina, Roeselia albula, Lepioptilus inulæ*). [J.M.]

Troníček, Edvard, "*Bacotia sepium* Spr. in Bohemia" [in Czech; Russian & English summaries]. *Acta Soc. Ent. Čechoslovenicæ*, vol.49: pp.90-92. 1 Oct. 1952. The habitat is described. [J.M.]

Troníček, Edvard, "Contribution to the knowledge of the lepidopterological fauna of Crete" [in English; Czech summary]. *Acta Ent. Mus. Nat. Pragæ*, vol.26, no.358: 15 pp. 1952. Gives results of expedition in 1936. Records 27 spp. of Rhopalocera and 4 spp. of Hesperiidæ; names 2 "forms" (of *Cœnonympha thyrsis* & *Vanessa atalanta*). [J.M.]

Troníček, Edvard, "Poznámky k výskytu motýlů východních Čech" [in Czech]. *Acta Soc Ent. Cechoslovenicæ*, vol.49: p.183. 15 Nov. 1952. Some spp. from East Bohemia. [J.M.]

Varin, G., "A la recherche du type de *Melanargia lachesis* Hübner" [in French]. *Rev. franç. Lépid.*, vol.14: pp.218-219. Jan. 1955. Research on the type locality of *M. lachesis;* probably Languedoc, S. France. [P.V.]

Vlach, Vilém, "Quelques microlépidoptères rares des environs de Prague" [in Czech; French summary]. *Acta Soc. Ent. Čechosloveniæ,* vol.48: pp.137-139. 30 Nov. 1951. Records of 5 spp. [J.M.]

Vlach, Vil., "Další zástupci microlepidopter nově zjištění pro Čechy" [in Czech; Russian summary]. *Acta Soc. Ent. Čechosloveniæ,* vol.49: pp.181-183, 4 figs. 15 Nov. 1952. Notes on 5 spp. and forms new for Bohemia. [J.M.]

Vorzheva, L. V., "Occurrence of the Lesser Apple-worm *(Laspeyresia pomonella* L.) in eastern Siberia" [in Russian]. *Biull. Otd. Biol. Moskov. Obshch. Isp. Prirody,* vol.59, no.3: pp.49-52. May/June 1954. [Not seen.]

Warham, John, "Autumn moths." *Country Life,* vol.110: pp.1540-1541, 5 figs. 9 Nov. 1951. Excellent photographs of living *Plusia gamma, P. chrysitis, Catocala nupta, Apamea monoglypha, Triphæna pronuba, Euphyia bilineata,* and notes on some other fall species in Britain. [P.B.]

Zeman, J., "Quelques noctuides de la Tchécoslovaquie" [in Czech; French summary]. *Acta Soc. Ent., Čechosloveniæ,* vol.48: pp.139-140. 30 Nov. 1951. Notes on *Oria musculosa, Euxoa crassa, Dasypolia templi.* [J.M.]

F. BIOLOGY AND IMMATURE STAGES

Anonymous, "The climbing cutworm in South Australia." *Journ. Dept. Agric. So. Australia,* vol.54: pp.184-189, 4 figs. Nov. 1950. Biology, phenology and control of *Heliothis armigera.*

Anonymous, "Cabbage white butterfly parasites." *Journ. Dept. Agric. So. Australia,* vol.55: p.68, 1 fig. Sept. 1951. Successful release of *Apanteles rubecula* for control of *Pieris rapæ.* [P.B.]

Anonymous, "Tomato stem borer." *Agric. Gaz. New So. Wales,* vol.65: pp.105-106, 2 figs. Feb. 1954. Biology and control of *Gnorimoschema plæsiosema.*

Armitage, John, "A rare British butterfly." *Country Life,* vol.112: p.475, 2 figs. 15 Aug. 1952. *Maculinea arion.*

Beaufoy, S. & E. M., "The Painted Lady invasion." *Country Life,* vol.111: p.1012, 5 figs. 4 April 1952. *Vanessa cardui;* good figures of all stages. [P.B.]

Beaufoy, S. & E. M., "A butterfly on the edge of its range." *Country Life,* vol.110: p.111, 9 figs. 6 July 1951. *Melitæa cinxia;* good figures of all stages. [P.B.]

Bellinger, Peter F., "Attraction of Zebra males by female pupæ." *Lepid. News,* vol.8: p.102. 17 Sept. 1954.

Blanchard, M., "Procédé de chasse original et observations sur *Hyalina* = *Deuterohyalina* [sic!] *albida* Esp." [in French]. *Bull. Soc. Ent. Mulhouse,* 1954: pp.30-31. April 1954. Observations on the psychid *H. albida.* An object which has been in contact with a virgin female is attractive to the males. [P.B.]

Bohart, Richard M., "Sod webworms and other lawn pests of California." *Hilgardia,* vol.17: pp.267-308. 1947. Life history and habits of *Crambus bonifatellus* and *C. sperryellus,* with lesser references to several other lawn pests. [J.T.]

Bucher, Gordon E., "Biotic factors of control of the European fir budworm, *Choristoneura murinana* (Hbn.) (n.comb.), in Europe." *Canad. Journ. Agric. Sci.,* vol.33: pp.448-469, 1 pl., 2 figs. Sept./Oct. 1953. Distribution, phenology, and natural enemies; records numerous parasites and a new virus disease. [P.B.]

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Merino Silva Santisteban, Edgardo, Guillermo Alvarez, & Octavio Velarde Nuñez, "*Pseudoplusia rogationis,* nueva amenaza para la agricultura costeña" [in Spanish]. *Agronomia, Lima,* vol.19: pp.105-123, 2 figs. [1954?]. Detailed descriptions of all stages and biology. Records a number of parasites. [P.B.]

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Narayanan, E. S., "Insect pests of stored grain and their control." *Indian Farming,* n.s., vol.3, no.7: pp.8-13, 26-27, 7 figs. Oct. 1953. Biology and control of *Corcyra cephalonica* & *Sitotroga cerealella;* figures all stages. [P.B.]

Narayanan, E. S., "Seasonal pests of crops: the Red-hairy Caterpillar, *Amsecta moorei* Butler and its control." *Indian Farming,* n.s., vol.3, no.6: pp.8, 9, 1 fig. Sept. 1953. Arctiid, polyphagous; figures all stages. [P.B.]

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Tinbergen, N., "Masters of camouflage." *Country Life,* vol.110: pp.1244-1245, 4 figs. 19 Oct. 1951. Describes experiments with jays as predators of larvæ of *Ennomos quercinaria, E. alniaria,* & *Biston betularia,* which closely resemble twigs. The camouflage was very effective; larvæ on foodplant in a cage were only eaten if they moved, or if the jay was encouraged by finding several and systematically tried out all the "twigs". [P.B.]

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G. PHYSIOLOGY AND BEHAVIOR

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Waterhouse, D. F., "Studies on the digestion of wool by insects. IV. Absorption and elimination of metals by lepidopterous larvæ, with special reference to the clothes moth, *Tineola bisselliella* (Humm.)." *Australian Journ. Sci. Res. B,* vol.5: pp.143-168, 2 pls., 8 figs. Feb. 1952. Reports detoxification of metals by formation of insoluble sulphates; latter not formed in *Plutella* or *Heteronympha,* which may store metals in goblet cells in midgut. [P.B.]

Waterhouse, D. F., "Studies on the digestion of wool by insects. V. The goblet cells in the midgut of larvæ of the clothes moth (*Tineola bisselliella* [Humm.]) and other Lepidoptera." *Australian Journ. Sci. Res. B.,* vol.5: pp.169-177, 3 pls., 1 fig. Feb. 1952. Histology studied in 18 spp. (17 families). No evidence for goblet cells in other orders of insects. [P.B.]

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NOTICES

Lepidopterists' Society members may use this page free of charge to advertise their offerings and needs in Lepidoptera. The Editors reserve the right to rewrite notices for clarity or to reject unsuitable notices. We cannot guarantee any notices but expect all to be *bona fide.*

WANTED: living cocoons of the Cecropia silkworm. Will gladly pay $15.00 per hundred, plus postage. C. M. Williams, Harvard Biological Laboratories, Cambridge 38, Mass., U. S. A.

I would like to hear from foreign collectors that could furnish me various species of the "Bird-wing Butterfly," the "Ghost-Moth," and other tropical butterflies. In the U. S. A., I wish to have a dozen butterflies from each state, to make a complete collection. Large species preferred. I have a large number of Illinois specimens for sale or exchange. I also have some Polyphemus cocoons, also Cecropia cocoons, for sale or trade; these are not large, but are healthy. Mrs. Edith L. Ragsdale, 429 N. Marion St., Centralia, Ill., U. S. A.

MORPHO PERSEUS, HECUBA, MENELAUS, and many other Brazilian butterflies for sale. Carefully papered with full data, good quality. Assortments on request. Jorge Kesselring, Caixa postal 6, João Pessoa (Paraíba), BRASIL.

LEPIDOPTERA — Must dispose of my duplicates, almost all spread. Have over 700 species to offer, list available. Liberal exchange for desired species. May consider sale in bulk. Alex K. Wyatt, 5842 N. Kirby Ave., Chicago 30, Illinois, U. S. A.

I am open to collect all species of Georgia Rhopalocera; will exchange for Formosan Rhopalocera. Also have many papered Papilios. James C. Brooks, 194 Riley Ave., Macon, Georgia, U. S. A.

Would like to exchange. I can offer Japanese and Formosan butterflies and some Japanese moths. Wish to have Lepidoptera (esp. butterflies) of all parts of the world. Hiraku Horii, No.175, 50-Banchi, Oguracho, Kitashirakawa, Sakyo, Kyoto, JAPAN.

Wanted: Ova/pupæ *Everes comyntas, E. amyntula, Colias eurytheme, Eurema lisa, Limenitis archippus, Precis lavinia, P. polyxenes asterius,* and *P. glaucus* (preferably from black female). Will exchange for British Rhopalocera live ova/pupæ or papered specimens. G. H. Phillips, Post Office, Far Sawrey Ambleside, ENGLAND.

AN UNNOTICED PAPER BY WILLIAM HENRY EDWARDS

ANDREW GREY WEEKS, JR., published a list of the scientific writings of WILLIAM HENRY EDWARDS on ten unnumbered pages that precede the title page of volume 2 of his *Illustrations of Diurnal Lepidoptera with Descriptions* (The University Press, Cambridge, Mass.; 1911). DOS PASSOS added to this list seven titles that had been overlooked by WEEKS, at the end of "The Entomological Reminiscences of William Henry Edwards" (*Journ. N.Y. Ent. Soc.* 59: 129-186; 1951). I have just realized that another paper should be added:

> 1875 — List of species of Lepidoptera collected in 1871, 1872, 1873 and 1874 in California, Nevada, Utah, Colorado, New Mexico, and Arizona, identified by William H. Edwards. *Report Survey west of the 100th Meridian,* Vol. 5: pp.791-794. Washington, D. C. 1875.

Although this paper appears to be an integral part of MEAD'S report, my copy of Kirby's *Catalogue* which had belonged to MEAD has a note in it in MEAD'S writing that clearly credits the list to W. H. EDWARDS.

F. M. BROWN, Fountain Valley School, Colorado Springs, Colo., U. S. A.

THE 1956 ANNUAL MEETING

This year's meeting will be held at the American Museum of Natural History in New York City on Thursday, 27 December, in conjunction with the meetings of the Entomological Society of America and other affiliates of the American Association for the Advancement of Science. Preliminary plans call for a single day of sessions, in order that members will be able to attend as many sessions as possible of other societies meeting that week in New York. The program is expected to include a symposium on a timely subject, round table discussions of ultra-violet light as a moth attractant and the hand-pairing technique, an open paper session, the business meeting, films on Lepidoptera, a dinner, and an evening social session. It is hoped that most members in the New York area will attend all or some of the day's program and that as many others as possible will come. The Program Chairman is SIDNEY A. HESSEL, and the Local Arrangements Chairman is Mrs. ALICE L. HOPF.

NOMINATIONS FOR 1957 OFFICERS

The Secretary has transmitted the following list of nominees for 1957 for vacancies among the officers and councillors, as submitted by the Nominating Committee (R. R. McELVARE, Chairman, J. A. COMSTOCK, A. DIAKONOFF):

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Ballots are being mailed with the dues notice to all members of the Society.

ADDITIONS TO THE LIST OF MEMBERS

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Beatty, George H., III, Dept. of Entomology and Zoology, Pennsylvania State University, University Park, Penna., U. S. A.
Bourliere, F. (Dr.), Faculté de Medicine de Paris, Lab. de Physiologie, 45 Rue des Saint-Pères, Paris 6, FRANCE.
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Miller, Lee D., 3331 Franklin Ave., Des Moines, Iowa, U. S. A.
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Philip, Kenelm W., 29 Huntington St., New Haven 11, Conn., U. S. A.
Rethschulte, Earnest F., 3057 Oak Forest Drive, Baltimore 14, Md., U. S. A.
Seiler, Denis (Dr.), 18 Promenade de la Seille, Metz - Queleu (Moselle), FRANCE.
Slater, Charles P., 7430 Village Drive, Prairie Village, Kansas, U. S. A.
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Term expires Dec. 1958:	G. van Son (Pretoria, South Africa) D. C. Ferguson (Halifax, Canada)

and *ex-officio:* the above officers and the Editor-in-Chief

The object of The Lepidopterists' Society, which was formed in May, 1947, and formally constituted in December, 1950, is "to promote the science of lepidopterology in all its branches, ... to issue a periodical and other publications on Lepidoptera; to facilitate the exchange of specimens and ideas by both the professional worker and the amateur in the field; to secure cooperation in all measures" directed toward these aims (*Constitution,* Art. II). A special goal is to encourage free interchange among the lepidopterists of all countries.

Membership in the Society is open to all persons interested in any aspect of lepidopterology. All members in good standing receive *The Lepidopterists' News.* Institutions may subscribe to the publications but may not become members. Prospective members should send to the Treasurer the full dues for the current year, together with their full name, address, and special lepidopterological interests. All other correspondence concerning membership and general Society business should be addressed to the Secretary. Remittances in dollars should be made payable to *The Lepidopterists' Society.* There are three paying classes of membership:

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Dues may be paid in Europe to our official agent: E. W. Classey, 22 Harlington Road East, Feltham, Middx., England.

Each year a list of members of the Society is published in the *News,* with addresses and special interests. There are six numbers in each volume of the *News.*

All members are expected to vote for officers when mail ballots are distributed by the Secretary each year.

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Volume 10 1956 Number 5

The
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NOMENCLATURE OF *PARNASSIUS* FORMS
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HUNGARIAN COLLECTION SAVED

(Complete contents on back cover)

8 May 1957

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NOTICE TO CONTRIBUTORS TO THE *NEWS*

Contributions to *The Lepidopterists' News* may be on any aspect of the study and collection of Lepidoptera in any part of the world. Particularly solicited are: 1) review papers on subjects of general interest to lepidopterists (*e.g.*, wing venation, mimicry, moth traps); 2) papers on such subjects as pre-adult stages, genetics, behavior, and comparative taxonomy (descriptions of new species and subspecies will be accepted); 3) field notes of more than a very local nature; 4) notes on well-tested techniques. Papers of more than ten pages will not normally be accepted.

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THE LEPIDOPTERISTS' NEWS

Volume 10 1956 Number 5

PRESIDENTIAL ADDRESS TO THE THIRD PACIFIC SLOPE MEETING OF THE LEPIDOPTERISTS' SOCIETY

Mr. Chairman, members, and guests of the Lepidopterists' Society—I am very grateful for the honour you have given me by electing me president of our Society for 1956. As your president this year, I send rather than bring my greetings. It is a very real disappointment to me that I am not able to attend the Third Pacific Slope meeting and participate in the symposium that is to be the main feature of your program, and in the discussions on the contributed papers. Unfortunately, this year my field work and many duties in connection with the forthcoming Tenth International Congress of Entomology, that will be held later this month in Montreal, Quebec, have made it impossible for me to attend your meeting. However, I offer some comments for thought and discussion in the few pages that follow.

The theme of your symposium "the various methods of approach to taxonomic solutions" is a complex one, and one that continually confronts all workers in systematics. The approaches to the solution of problems on species recognition are many, and often complex in closely allied species. The usual and basic method for distinguishing species is by external or internal anatomy (or morphology, if you wish). Comparative anatomy may be regarded as the basic or primary tool for research in taxonomy. As such it might appropriately be considered as the plough to turn the fundamental furrow of taxonomic investigation. However, this approach often has its limitations, especially in the investigation of closely allied or sibling species. For example, the elucidation of the biological status of such "well known" species as the papilios or nymphalids of the Cordilleran or Rocky Mountain System, requires much more refined implements. I firmly believe that even though the "plough" is the foundation for basic taxonomic investigation, several keen, small, scalpels are required to distinguish the numerous cryptic taxonomic entities that confront us in almost all insect groups. The most important of these fine implements is, I believe, the investigation and observation of the behaviour, or life history in detail, of populations in their natural environment, particularly those populations in different ecological niches. It is, of course, easier to investigate obviously different macro environments than it is to study the obscure differences prevailing in micro environments. However, I believe, that any difference in behaviour is significant at the specific or sub-specific level, and that ecological correlation, if definable, is helpful but subordinate. It is impossible to visualize two ecologically different insect populations that do not also exhibit differences in behaviour. Therefore, de-

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tailed field observations often provide the best approach to practical or theoretical insect taxonomy.

An explanation of the multitude of behaviouristic and morphological complexities that we observe is sometimes sought through studies of inheritance, chromosome morphology, gene flow, gene constellations, and gene frequency within populations. These important and fundamental branches of biology, genetics, and cytology, help to explain some of the differences we see, as well as some we don't see, but there is doubt in my mind that even these fine scalpels can reveal all differences in the behaviour of organisms.

Another method of analyzing our observations is by utilizing statistics. This method, like all the others, appears to have its limitations, not through the fault of the science of mathematics, but through the frequent lack of data, and through the biological phenomenon of the persistence of gradients in biological entities, which, by the process of organic and inorganic evolution, are never static.

Still other aids to taxonomy may be found in the sciences of chemistry, physiology, geology, and meteorology. All of these together would no doubt afford the best method for scientific analysis of many taxonomic problems. However, such a concentrated approach using all known disciplines and techniques is impractical as a rule. Let us go back to behaviour. This is something that every individual worker can observe. Differences in the life histories and behaviour of insect populations in different regions may be found, regardless of the proximity of those regions.

During the last few years, I have been studying the minute Lepidoptera that mine the leaves of plants. Here is a field of endeavour that illustrates the importance and ease of recognition of behaviour differences. Here also is a field where each of us can make an important scientific contribution in our own back yard or nearby woodlot. The vast field of taxonomy of the leaf miners is almost untouched in the Cordilleran Region. New species are everywhere awaiting discovery. The moths are usually beautiful little jewels of biological splendor. They require little space to house as a collection and afford an opportunity for taxonomic investigation at a high level in the light of modern systematics. They also challenge one's ingenuity and ability as a technician in lepidopterology. Special problems are encountered in pinning and spreading some of them whose wing expanse is just over 2 mm.

This hastily prepared address was written during a rainy day on the north shore of Lake Erie, in the Carolinian Zone, where I am at present collecting lepidopterous leaf-miners and other moths, making observations on their behaviour and the kinds of mines they construct. A substantial proportion of the species reared appear to be new to science.

Before closing I should like to extend an invitation to all of you to attend the forthcoming International Congress of Entomology. There, I hope you may learn, among other things, something of the taxonomy and distribution of the various species of butterflies that inhabit the land of the midnight sun.

T. N. Freeman

A NEW SPECIES OF *PAPAIPEMA* (NOCTUIDÆ) FROM NEW JERSEY

by OTTO BUCHHOLZ

The new species described below is a member of the *Papaipema necopina* Grote group, whose species are very difficult to tell apart by characters of the color and pattern; the foodplant and genitalia seem to be the best means of separating them.

Papaipema mulleri BUCHHOLZ, new species

Head, thorax, and the upper side of the primaries dark gray with brown reflections; the subterminal space with a violet tint and a faint t.p. line. Anterior tuft adze-shaped. Abdomen and upperside of the secondaries very light gray. Underside of the wings the same tone as the upperside, darkening gradually toward the outer margin. No external characters were found by which the adults could with certainty be separated from *P. necopina.*

Male genitalia (Holotype): Uncus flat, broad, widest medially, tapering apically to an elongate truncate point, with lateral pieces at base of uncus separated from uncus by their own width; anal tube lightly sclerotized, with a well-defined, roughly U-shaped subscaphium; penicular region of tegumen rounded laterally; vinculum elongate, tapering; juxta a subtriangular plate, continued dorsally as a wide, broad, transtilla-like structure, scobinate medially, and with lateral sclerotized arms that extend antero-laterally into the valves, then swing posteriorly to form the claspers. Valves with large, heavily spined, bifurcate cucullus, the lateral arm of which is of even width, then sharply constricted apically, terminating in a curved spine; clasper bifurcate, the arms long and pointed, the posterior arm with numerous teeth on outer margin; sacculus very broad, with distal margin of sclerotized area truncate, with prominent clavus. Ædeagus elongate, very slightly tapered distally; vesica armed with a single stout spine medially, and with two terminal bands of well-defined teeth, terminating in a rounded sclerotized protuberance on the left side.

The genitalia of this species are similar to those found in *P. necopina* Grote, but a number of differences are present. In *necopina* the uncus tapers more or less evenly to a blunt point, while in the present species the apex is elongate and truncate; the lateral pieces of the uncus are just barely separated from the base of the uncus in *necopina,* while they are much farther out in this species. The subscaphium and the dorsal transtilla-like structure are more strongly developed in the new species, and the ventral plate of the juxta is better defined and distinctly triangular. The lateral arm of the cucullus in *necopina* tapers in width, terminating in a blunt point, while in this species this arm is broader, and is sharply constricted apically, terminating in a curved spine. The terminal bands of spines in the vesica are more strongly toothed in this species than in *necopina,* and the ventral band in the latter species is smaller and more weakly represented.

Described from 10 specimens (7 males and 3 females), all ex-larvæ reared from *Helianthus strumosus* L., and all taken by JOSEPH MULLER along highway 206 about six miles north of Stanhope, Sussex County, New Jersey.

HOLOTYPE, male, ex-pupa 9 August 1951; ALLOTYPE, female, ex-pupa 4-5 September 1951; PARATYPES, 6 males and 2 females ex-pupæ 30 and 31 August and 4, 5, 8, 9, and 16 September 1951. The Holotype is being deposited in the American Museum of Natural History in New York. For the present the Allotype and 2 male and 1 female paratypes are retained in the collection of the author; the other 4 male and 1 female paratypes are in the collection of JOSEPH MULLER.

The larva is in general usual for *Papaipema* in color and markings. The dorsal line is unbroken. A black line on the side of the head extends along the thoracic shield. The foodplant is entered three inches above ground level, and the burrow extends to one inch below ground level. The larva causes no swelling of the plant. It leaves the plant for pupation in the ground. The adults emerge two weeks earlier than its nearest ally, *P. necopina.* The foodplants of *P. necopina* are *Helianthus divaricatus* L. and *Cacalia tuberosa* Nutt.

I am pleased to dedicate this species to my friend JOSEPH MULLER, of Lebanon, New Jersey, who did all the field work. My thanks go to Dr. FREDERICK H. RINDGE, Associate Curator of Insects, of the American Museum of Natural History, who studied the genitalia and prepared the entire description of the genitalia.

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INFRA-SUBSPECIFIC NAMES AMONG *PARNASSIUS*

by F. MARTIN BROWN

For nomenclatorial purists "form" names of lesser stature than subspecies are annoying synonymic parasites. Form names serve a purpose for the serious student of variation fully as great as species and subspecies names. Both types of names are useful only because they stand for an otherwise cumbersome description. When a type of variation from the normal pattern occurs throughout a group of species or even a group of genera — such as albinic females among Pieridæ — it is very much worth while calling attention to this phenomenon. Such albinism has been investigated and found to be genetic. Similar less conspicuous variation crosses specific lines among butterflies. In time we may learn if they, too, are genetic or physiologic reactions to environment that can occur within the strictures imposed by the genes. The darkening of some butterflies when exposed to cold during immature stages falls within physiologic reactions. Infra-subspecific names are useful in such genetic and physiologic studies.

Perhaps the greatest nomenclatorial furor among American taxonomists has been stirred up by the application of infra-subspecific names by European students of the genus *Parnassius.* Until recently I looked down my nose at such naming. My change of mind came about when I started to make a detailed study of variation among *Parnassius phœbus* Fabricius (the species best known in North America as *P. smintheus)* as it occurs in the Rocky Mountains. Anyone who has collected several dozen specimens of this species at a single locality will realize the bewildering variation that occurs. The task I set myself is to bring some order to our understanding of this and to determine if any of it is geographically constant enough to be used as the basis for a better understanding of subspeciation in the Rocky Mountain fragment of the species.

OTTO BANG-HAAS (1915) first applied infra-subspecific names to *Parnassius* in such a way that these names crossed subspecific and specific lines. BRYK and EISNER expanded the system enormously in their various articles in *Parnassiana* and elsewhere. Recently EISNER (1955) has published a summary of these names. Since this article is not easily accessible to most American collectors, I here present the *nomina collectiva* used with a translation from German of the definitions:

1) Affecting all wings

f. "magna" — markedly large.
f. "minuscula" — markedly small.
f. "nigricans" — wing basically darkened.
f. "umbratilis" — hyaline, darkened overall.
f. "albicans" — wing basically pale.
f. "flavicans" — wing basically yellowish.
f. "diaphana" — extraordinarily thinly scaled.
f. "inversa" — female with male pattern.
f. "perversa" — male with female pattern.

2) Forewing

f. "marginata" — marginal band unusually wide.
f. "immarginata" — without hyaline marginal band.
f. "niphetodis" — hyaline marginal band invaded by white scales.
f. "seminiphetodis" — the white scaling along the margin extending inward as wedges.
f. "pura" — without the inner-margin spot on the forewing.
f. "primopicta" — the first costal spot red-centered.
f. "secundopicta" — the second costal spot red-centered.
f. "tripicta" — three red-centered costal spots.
f. "quadropicta" — four red-centered costal spots.
f. "inpicta" — costal spots without red centers.
f. "albopicta" — the red of the costal spots white-centered.
f "quincunx" — the spot at end of cell extends only to upper vein of cell (R_s).
f. "antiquincunx" — the spot at end of cell extends beyond the upper vein of cell.
f. "binaria" — the spot in the middle of the cell divided.
f. "ernestinæ" — the spot in the middle of the cell reduced to a point.
f. "kitti" — the spots in the middle and at the end of the cell reduced to points.
f. "halteres" — the cell spots joined by a black band.
f. "orbifer" — the cell spots with a ring-shaped connection.
f. "cellopura" — the cell spots absent.
f. "fasciata" — costal spots and inner-margin spot joined by costal band of black.
f. "ornata" — inner-margin spot red-centered.
f. "inornata" — inner-margin spot without red center.
f. "lunulata" — white spots in the dark ground of the margin.
f. "elunulata" — lacking white spots in the dark ground of the margin.
f. "grundi" — an additional spot between the cell spots.
f. "fermata" — an additional spot between inner-margin spot and base of the wing.
f. "basipunctata" — a black spot at the base of the wing.

3) Hind wing

f. "rubroöcellata" — ocelli filled with red.
f. "flavoöcellata" — ocelli yellow-colored.
f. "ochreoöcellata" — ocelli orange-colored.
f. "bruneoöcellata" — ocelli brown-colored.
f. "alboöcellata" — ocelli white, without other color.
f. "albopupillata" — white center within the colored part of the ocelli.
f. "ocelloconjuncta" — ocelli joined by a black band.
f. "ocellorubroconjuncta" — ocelli joined by a red-scaled band.
f. "nigroöcellata" — ocelli entirely black.
f. "nigrodivisoöcellata" — middle ocellus divided by a black line along the vein.
f. "rubrodivisoöcellata" — the white center of the middle ocellus divided by red scaling along the vein.
f. "ocelloëxtincta" — ocelli absent.
f. "melanconica" — basal spot without red center.
f. "excelsior" — first basal spot red.
f. "biëxcelsior" — first and second basal spots red.
f. "lacrimans" — costal ocellus connected with the base of the wing by a black band.
f. "rubrolacrimans" — costal ocellus connected with base of wing by a red band.
f. "discocircumcincta" — abdominal margin blackened to the cell and with an extension toward the middle of the costal margin.
f. "rubroanalis" — anal spot red-centered.
f. "ampliusanalis" — three anal spots.
f. "analisconjuncta" — anal band joined with the middle ocellus.
f. "exanalis" — anal spot absent.
f. "dentata" — submarginal area well-depicted.
f. "latecincta" — ocelli unusually boldly margined with black.
f. "tenuicincta" — ocelli with very narrow black margins.
f. "intertexta" — a yellow ring between black ocellus-margin and colored center.
f. "excincta" — ocelli without black margin.
f. "atroguttata" — black spot in the center of the cell.
f. "siegeli" — an additional black spot between costal ocellus and base of wing.
f. "theiodes" — hyaline marginal band preserved.

The above names are purely descriptive and when used do not take an author's name. They have no nomenclatorial status. Their use should be limited to studies of variation until we understand much more about the characteristics they present. Many specimens will present several of the variants. For instance, I have before me a specimen of *P. phœbus catullius* Fruhstorfer from the Great Sand Dunes area in Colorado that combines these variations on the forewing: marginata, primopicta, antiquincunx, inornata, and lunata. On the hind wing of the same specimen these variations are combined: rubroöcellata, albopupillata, dentata, and theiodes. To include all of these in the citation of the specimen is nonsense. However, for tabulation of the variation found in a series, the names are very useful. They may prove to be the tools by which the geographic variation — subspecification — of the species is finally unraveled and put on a firm basis.

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CORRECTIONS AND ADDITIONS CONCERNING THE GENETICS OF *COLIAS ERATE POLIOGRAPHUS* (PIERIDÆ)

by SHIGERU ALBERT AE

KOMAI and AE (1953) published a paper on "Genetic studies of the Pierid Butterfly, *Colias hyale poliographus.*" REMINGTON (1954) has suggested that certain items in the paper of KOMAI and AE be clarified. In the present paper, the junior author of the 1953 paper, with the approval of the senior author, will undertake the clarification of those items, together with the presentation of some additional data which were collected in 1952-1953 at the Catholic University of Nagoya, Honshu, the main island of Japan.

At the outset, the subspecies *poliographus* Motschulsky has been transferred from the species *C. hyale* Linné to the species *C. erate* Esper, and so will be referred to below as *C. erate poliographus.*

THE SEX-LIMITED "ALBA" GENE

Proof that the sex-limited "alba" gene, which controls female dimorphism in *Colias,* is autosomal, not sex-linked with female heterogamety, requires that both female forms appear among the daughters of a cross between an "alba" female and a male known to be homozygous for the recessive allele.

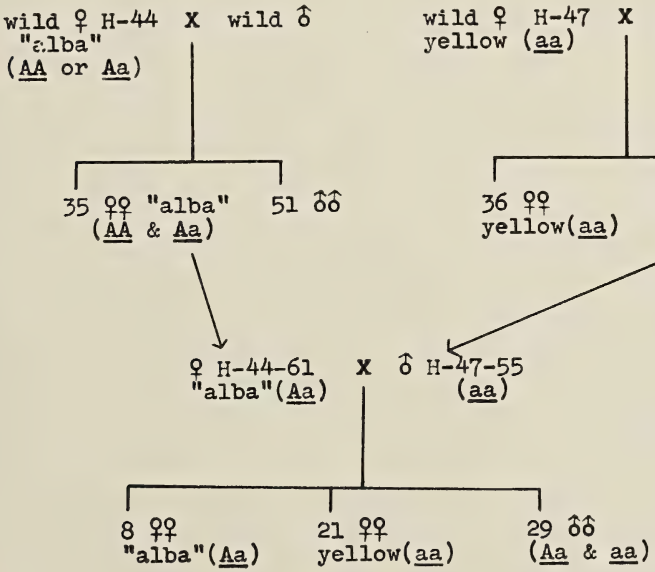

Fig. 1. Genealogy of an "alba" female brood.

This had been proved for *Colias eurytheme* Bdv. and *C. philodice* Latr. (Remington 1954). Dr. REMINGTON also pointed out that "Brood 44-61 of Komai and Ae (1953) for *Colias erate poliographus* Motsch. is probably another example of this cross, but the published data are inadequate for certainty." The writer presents here more detailed data which actually prove it for *C. erate poliographus.* The mother of Brood H-44-61 (referred to as Brood 44-61 by REMINGTON) was from Brood H-44 from a wild "alba" female. Brood H-44 consisted of 35 "alba" females and 51 males. The father of Brood H-44-61 was from Brood H-47 from a wild yellow female. Brood H-47 consisted of 36 yellow females and 30 males. Therefore it is clear that the father of Brood H-44-61 had an *"aa"* genotype. *W-w* alternative symbols for the white ("alba") and yellow alleles in the 1953 paper are replaced here by *A-a* as suggested by REMINGTON (1954). Brood H-44-61 consisted of 8 "alba" females, 21 yellow females, and 29 males (Fig. 1).

Twenty-five "alba" females were sent from the University of Hokkaido, Sapporo, Hokkaido, the most northern island of Japan, to the Biological Laboratory of the Catholic University of Nagoya by Mr. SHOZO EHARA in fall 1952. Eleven of them laid eggs, and the larvæ from these eggs were raised at the laboratory. Table I shows the results. Broods 0-2, 0-4, 0-5, 0-6, 0-9, and 0-10 may be presumed to be all "alba" broods without much doubt. Brood 0-3, consisting of 39 "alba" females and 8 yellow females, may be the result of *Aa* × *Aa* mating and probably shows the low viability of *"aa"* individuals, just as in the Kyoto district of Honshu. From the matings of the butterflies of the above broods (one wild male from the Nagoya district was also used), it was proved that Broods 0-4, 0-5, 0-9, and 0-10 had carried the *"a"* gene also. Sex ratios in a few cases in Table I are far from expected 1 : 1; however, facilities did not give an opportunity to examine this phenomenon.

WHITE AND PALE MALES

Dr. REMINGTON pointed out that no further rearings, of the broods in which white males appeared, were mentioned by KOMAI and AE (1953). The relatives of No. 1 and No. 2 white males of the 1953 paper are as follows:

No. 1:— Brood K-2 from a wild faded female (yellowish, but much paler than ordinary yellow females) consisted of 44 "alba" females and 62 yellow males (*aa* × *AA*). Two sib matings were obtained from this brood. Brood K-2-6 and Brood K-2-16 were obtained from these sib matings. Brood K-2-6 consisted of 1 white male, No. 1, and 1 yellow male and no females. Brood K-2-16 consisted of 16 "alba" females and 17 yellow males. No further mating was obtained because of the winter season. Therefore, the genotype of this No. 1 white male for "alba" gene could be *AA, Aa,* or *aa.* Consequently the sentence "All his sisters were white." at the fourth line from the bottom of page 68 in KOMAI and AE (1953) is wrong and must be corrected.

No. 2:— Brood B-2 from a wild "alba" female consisted of 55 "alba" females and 63 males, and Brood B-4 from a wild "alba" female consisted of 28 "alba" females and 19 males. From the mating between an "alba" female of Brood B-4 and a male of Brood B-2, Brood B-4-8a was obtained which consisted of 7 "alba" females and 1 white male, No. 2, and 1 yellow male. Therefore, the genotype of No. 2 white male for "alba" gene may possibly

TABLE I. Offspring of 13 Japanese wild "alba" ♀♀ of *Colias erate poliographus*

			Offspring			
Brood	Parents		"alba"	yellow		Total
Number[1]	♀♀	♂♂	♀♀	♀♀	♂♂[2]	
0-1	wild	wild	7	0	6	13
0-2	wild	wild	16	0	29	45
0-3	wild	wild	39	8	58	105
0-4	wild	wild	42	0	43	85
0-5	wild	wild	30	0	30	60
0-6	wild	wild	23	0	12	35
0-7	wild	wild	8	5	10	23
0-8	wild	wild	7	0	8	15
0-9	wild	wild	26	0	54(1)	80
0-10	wild	wild	47	0	53	100
0-11	wild	wild	7	0	25	32
0-3-14[3]	"alba"	0-3-10	7	0	4	11
0-3-15	"alba"	0-3-11	5	0	12	17
0-4-3	"alba"	0-4-1	17	0	33	50
0-4-8	"alba"	0-4-6	17	0	25	42
0-4-32	"alba"	0-4-29	2	1	5	8
0-4-37	"alba"	0-4-31	6	0	11	17
0-5-17	"alba"	wild	7	3	19	29
0-6-8	"alba"	0-6-2	4	0	23	27
0-6-10	"alba"	N-4-34-7	15	0	24(1)	39
0-6-26	"alba"	0-9-52	48	0	63(36)	111
0-7-6	yellow	0-9-46	27	21	58	106
0-10-9	"alba"	0-10-2	8	0	6(1)	14
0-10-10	"alba"	0-10-5	18	0	24	42
0-10-19	"alba"	0-10-15	5	2	1	8
0-10-57	"alba"	0-10-53	23	0	15	38
0-10-34	"alba"	0-9-12	20	0	26	46
0-10-49	"alba"	0-7-1	51	0	34	85
0-6-26-49	"alba"	0-6-26-29	23	0	17(7)	40
N-3	wild	wild	9	0	12	21
N-4	wild	wild	7	9	25	41
N-3-21	"alba"	N-3-20	11	0	10(3)	21
N-4-34	yellow	N-3-20	5	0	7	12

[1] The prefix 0 of the brood number is used for stocks from wild ♀♀ from Sapporo, Hokkaido; N for stocks from Mt. Myoko, Niigata Pref., Honshu. 0-4-3 means 3rd butterfly emerging in Brood 0-4; if this individual was a ♀ from which a brood was then raised, this whole brood received the same designation, i.e. 0-4-3. All wild females were "alba".

[2] ( ) Number of males with pale yellow cell spots on the upper side of the hind wing.

[3] For this and the next seventeen 0- broods, and for broods N-3-21 and N-4-34, the designation of the female parent is the same as the brood number.

be *AA* or *Aa.* No. 2 failed to harden his veins, and no further mating was possible. His relatives produced a total of 26 "alba" females, but no yellow females, and 33 yellow males, but no white males.

Several pale males, of which the yellow ground color was reduced toward white, were obtained among the laboratory males. They emerged at the Catholic University of Nagoya in the winter of 1952-1953. The cages were placed at the window side of the laboratory which the sunshine reached well. The room temperature was usually between 5°C and 15°C in January and February, 1953. Six color grades were set up by an arbitrary standard. Grade 6 is the grade of a typical yellow male, and grade 1 is pure white. Four intermediate grades, which were equally divided according to paleness, were applied for pale males. Consequently grade 5 (slightly paler) in this standard is rather common among early or late season males in the wild as well as laboratory. The No. 1 white male above mentioned has grade 1, and No. 2 has grade 2. Table II shows these arbitrary color grades of male butterflies which emerged between October and March in Broods 0-5 and 0-11, both of which included pale males.

TABLE II. Arbitrary color grades of ♂♂ of two broods containing pale ♂♂

Brood Number	Month of Emergence	Color Grades*					
		6	5	4	3	2	1
0-5	October	1	3	—	—	—	—
	November	2	—	—	—	—	—
	December	1	—	—	—	—	—
	January	—	—	1	—	—	—
	February	1	4	—	3	—	—
	March	1	1	—	—	—	—
0-11	October	11	—	—	—	—	—
	November	1	2	—	—	—	—
	December	—	—	—	—	—	—
	January	—	2	—	1	—	—
	February	—	2	—	1	—	—

*Grade 6 indicates typical yellow male; grade 1 would be pure white.

All of the white and pale males above mentioned had no distinguishable differences in the melanin coloration (usual dark markings) from other yellow males. It is clear that the environment has some effects on this pale color, and at the same time it is possible to presume hereditary effects, because the majority of males of Broods 0-5 and 0-11, and many other broods, emerged under the same conditions as the pale males, yet these others kept their yellow color. The cell-spot on the upper side of the hind wing of these pale males was usually orange, although its color was somewhat lighter. No yellow female emerged in the midwinter.

CELL-SPOT ON THE HIND WING

The difference in color of the cell-spot on the upper side of the hind wing seems to be determined on a monogenic basis, orange dominant over pale-yellow (KOMAI and AE, 1953).

A further study was done in 1952-1953. Only one pale-yellow spotted male, 0-9-52, appeared among the 54 males of Brood 0-9 (Table I). This male was mated with an "alba" female, 0-6-26. The sib mating of Brood 0-9 was completely unsuccessful. The Brood 0-6-26, from the above mentioned mating, consisted of 27 orange spotted males, 36 pale-yellow spotted males, and 48 females. One male, 0-6-26-29, among the above 36 pale-yellow spotted males, was mated to one of his "alba" sisters, 0-6-26-49, and the resulting brood consisted of 10 orange spotted males, 7 pale-yellow spotted males, and 23 "alba" females. This brood was raised in an incubator which was controlled between 27°-29°C. In this case the cell spots of 23 "alba" females were also divided into 11 orange and 12 pale-yellow, although a few of them are close to the intermediate between orange and pale-yellow (Table I and Fig. 2).

One "alba" female, N-3, collected at Mt. Myōkō, Niigata prefecture, Honshu, by the writer, left a progeny of 9 "alba" females and 12 orange spotted males. A sib mating (N-3-21 × N-3-20) from this brood produced 11 "alba" females, 7 orange spotted males, and 3 pale-yellow spotted males. The father of this sib-mating was again mated with a yellow female, N-4-34, from another brood from Mt. Myōkō and produced 5 "alba" females and 7 orange spotted males. One of these orange spotted males, N-4-34-7, was mated with an "alba" female, 0-6-10 of Brood 0-6, and left a progeny of 15 "alba" females, 23 orange spotted males, and 1 pale-yellow spotted male (Table I and Fig. 2). Brood 0-10-9 derived from a sib mating of Brood 0-10 consisted of 8 "alba" females, 5 orange spotted males, and 1 pale-yellow spotted male (Table I).

Differences between orange and pale-yellow cell spots in males are very clear in summer broods and in Brood 0-6-26-49, which was raised in the incubator at 27°-29°C. However, it is not perfectly clear in fall broods, as in 0-6-26. Many of the pale-yellow cell spots in Brood 0-6-26 had slightly orange coloration, which may correspond with "pale semi-orange" of REMINGTON in *C. philodice* (1955). Seven of them may be listed as "semi-orange," and two with orange cell spots may also be close to "semi-orange." Some of the others with orange cell spots may correspond with "deep semi-orange." The males of Broods 0-9-52 and 0-6-26-29 may be classified as "pale semi-orange." However, Brood 0-6-26-49, whose father was 0-6-26-29, produced a clear-cut, 10 orange : 7 pale-yellow (yellow of REMINGTON, 1955). Therefore the writer presumes it is reasonable to divide the males of Brood 0-6-26 into two genetic classes, orange and pale-yellow, assuming that several individuals are somewhat intermediate in color due to environmental or minor hereditary variation.

Cell spots of "alba" females of Brood 0-6-26, raised in the laboratory in uncontrolled conditions, show a continuous variation. However, if they are roughly divided into 4 groups, the results are 11 orange (although not so deep as males), 19 light orange, 12 lighter orange, and 2 pale egg-yolk color, (4 were lost out of 48 females). The mother of Brood 0-6-26-49 was from the orange group. This brood, raised in the incubator at 27°-29°C., included 23 "alba" females which fell into two distinct groups (referred to, above, as "orange" and "pale-yellow"): 11 light orange and 12 pale egg-yolk color.

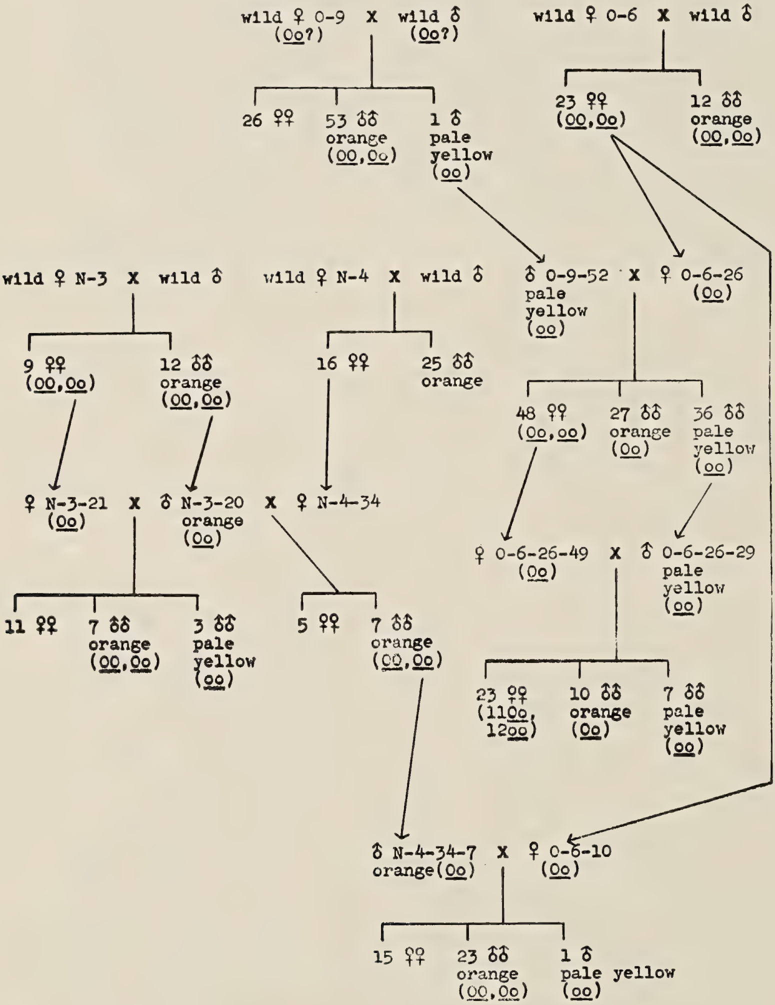

Fig. 2. Genealogy of one pale yellow cell-spotted line.

Correlation in hereditary factors in cell spots between male and female may be suggested by the above data. However, more studies are necessary to clarify this point.

It is difficult to interpret 53 orange : 1 pale-yellow and 23 orange : 1 pale-yellow ratios. A reduced penetrance of genes for pale-yellow cell spot in homozygous individuals can be considered, as well as a low viability of them. However, in general, it is most probable that a recessive gene which is fairly common in nature is controlling the heredity of pale-yellow cell spot. In Fig. 2, *O* - *o* alternative was used as *O* for orange and *o* for pale-yellow.

CORRECTIONS OF FIGURES IN TABLES

The following corrections are necessary for the tables of KOMAI and AE (1953).

Table 1, group 1: $\chi^2 = 0.46$ instead of "2.22"; $0.3 < P < 0.5$ instead of "$0.1 < P < 0.2$."

Table 3: %w in female at Tokiwa is 77.3 instead of "77.2" and at Arakawa is 73.5 instead of "72.2."

Table 4: %w in June-August in 1949 is 68.6 instead of "69.9."

SUMMARY

1. It was proved that the sex-limited "alba" gene, which controls female dimorphism in *Colias erate poliographus,* is autosomal, not sex-linked with female heterogamety.

2. Laboratory breeding of the progeny from 11 "alba" females of *C. erate poliographus* from Hokkaido, Japan, was carried on.

3. The relatives of 2 laboratory white males in the 1953 paper were described to show the relation between these two white males and "alba" genes.

4. A number of pale males of *C. erate poliographus* were produced among the butterflies raised in the laboratory in winter.

5. A further study of the hereditary basis of the orange and pale-yellow cell spots on the upper side of the hind wing of *C. erate poliographus* was made, and its monogenic basis was confirmed.

ACKNOWLEDGEMENTS

The writer wishes to express his sincere gratitude to Dr. TAKU KOMAI, National Institute of Genetics, Misima, Japan, and Dr. KENJI NAKAMURA, Zoological Institute, Kyoto University, Japan, for direction of the research; to Dr. EDWARD O. DODSON, Department of Biology, University of Notre Dame, for help in writing this paper; and to Dr. CHARLES L. REMINGTON, Department of Zoology, Yale University, for his advice that we clarify the few items in the 1953 paper. The writer also wishes to thank Mr. S. EHARA for sending materials from Hokkaido.

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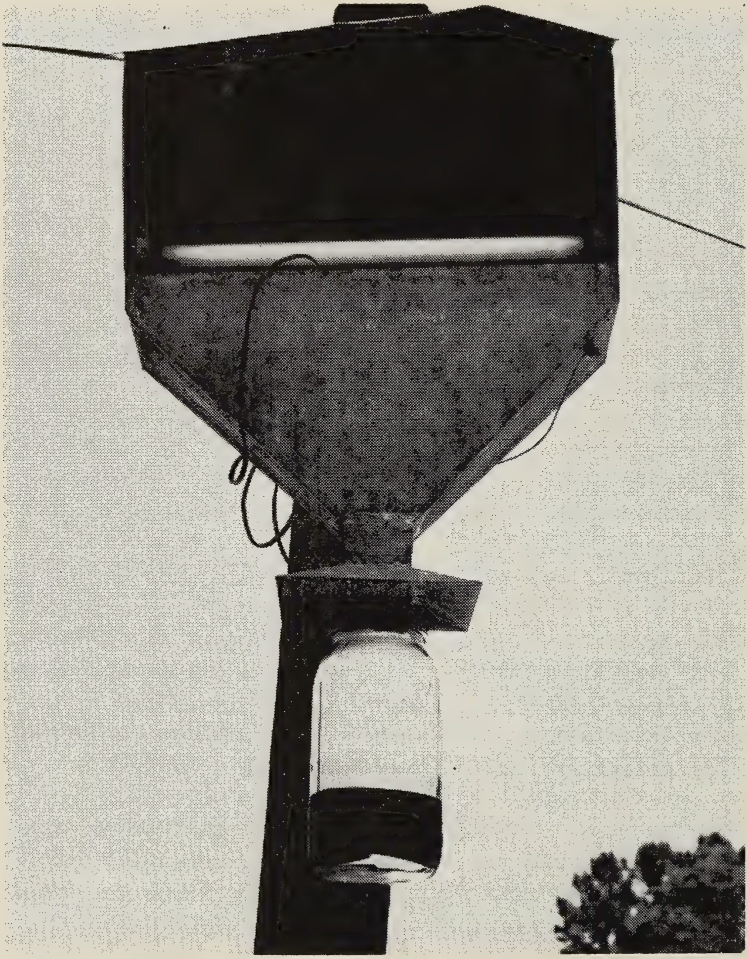
ETHYL ACETATE AS A KILLING AGENT FOR INSECTS

by H. A. DENMARK

With the increasing use of light traps as a survey instrument and for taking insects by collectors, killing agents are important. Insects to be determined should be in good condition when collected. All collectors desire to have perfect specimens for their collections. Since electric insect traps are being used as part of the Insect Pest Survey, the State Plant Board of Florida has been interested in a killing agent that would permit the taking of insects in a condition for correct determination and specimens good enough for the Plant Board collection.



Killing Jar Attached to Blacklight Trap

Cyano-Gas was first used as a killing agent. The powdered form of Cyano-Gas was placed in a small container with a perforated top that would hold 2 tablespoonsful and placed in the bottom of a half gallon glass jar. As soon as the jar was approximately half full of insects the killing agent was no longer effective, as the insects almost completely blocked the gas.

Ethyl acetate is the killing agent now used. The method employed is as follows: a half gallon glass jar is coated with approximately ¼ inch of plaster-of-Paris on the inside by rotating the semi-liquid plaster-of-Paris until it hardens. The plaster-of-Paris creates enough heat that the jar often is broken by heat and expansion. To prevent this the plaster-of-Paris is allowed to harden for 36 hours before being used, by placing the jar in 5 to 6 inches of water. The lower half of the jar is wrapped with friction tape to prevent the cutting of the operator's hand in case the jar breaks.

Each night before operating the electric insect trap, 20 to 25 cc. of ethyl acetate is poured down the inside of the jar and the jar quickly rotated. The plaster-of-Paris absorbs the liquid, providing a killing agent from bottom to top of the jar. Insects continue to be killed until the jar is filled. During the cooler months the same amount of ethyl acetate will continue to kill insects 2 or 3 nights. The jar is attached to the electric insect trap as illustrated in the figure. The insects can be collected and pinned directly from the jar. Unless a large number of beetles are collected, destroying the moths, the moths are relaxed and ready for spreading upon removal from the jar.

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NOTES ON THE OCCURRENCE OF *THYMELICUS LINEOLA* (HESPERIIDÆ) IN NORTH AMERICA: A SUMMARY

by Harry K. Clench

A number of new locality records recently have been published for this comparative newcomer to the North American butterfly fauna, and with a few more to add here it seems an appropriate time to gather into one place all these records.

The following list includes all the records, hitherto published or otherwise, known to me of the occurrence of *Thymelicus lineola* Ochs. in North America. In each case the source is given, and occasionally a few remarks.

ONTARIO: London; first North American record, 1910; later seen in 1912, 1913, but not since (T. N. Freeman, *in litt.).* Amherstburg (Univ. Michigan, Mus. Zool.). Toronto; first found in 1945; often common, as in 1953, but fluctuates widely in numbers from one year to another (S. L. Thompson, *in litt.;* specimens in Carn. Mus.). St. Catherines; extremely abundant (Bailey, 1953).

MICHIGAN: Wayne Co.: Detroit (Rawson, 1931; many collections). Oakland Co.: Oak Park (Univ. Michigan Mus. Zool.). Macomb Co.: Warren

(Univ. Michigan Mus. Zool.). Washtenaw Co. (all coll. or obs. by CLENCH, 1949): nr. Saline; 6½ mi. W. of Clinton, Lenawee Co.; Geddes Rd. at Huron R., E. of Ann Arbor; Willow Run, 3 mi. E of Ypsilanti; 1 mi. W. of Ann Arbor; ½ mi. W. of Lima Center; Dexter. Lenawee Co.: ¼ mi. E. of Clinton, just S. of Washtenaw Co. line (CLENCH).

NEW YORK: Niagara Co.: Niagara Falls (W. MERGOTT, personal communication). Erie Co: Kenmore, N. of Buffalo, 1948 and again in 1951 (W. MERGOTT, personal communication).

OHIO: Hancock Co.: Findlay (RAWSON, 1931; THOMAS, 1953). Franklin Co.: Columbus (THOMAS, 1953) — a remarkable record.

It is worth adding that on the same trips that yielded many of the Michigan records (made in the company of Dr. and Mrs. J. V. SLATER and their family, and of Mrs. CLENCH), eastern Jackson County was examined at several likely places, but no trace of *lineola* was found. From this I concluded (CLENCH, 1950) that western Washtenaw County marks the approximate western boundary of the present *lineola* range.

As noted above, Mr. STUART THOMPSON, of Bessboro, Toronto, Ontario, in a letter commented on the remarkable fluctuations in numbers of the species near Toronto. The fluctuations there, varying from abundant to completely missing according to Mr. THOMPSON, would seem larger than I had experienced around Willow Run, which at the time were remarkable enough. In the latter locality during my stay there it was never absent entirely in its proper season, and ranged from one year to another from frequent to very abundant. The peaks of abundance as noted by Mr. THOMPSON near Toronto and myself at Willow Run seem fully comparable, for he states that at peak frequency he could easily capture half a dozen in one sweep of the net any place, which well describes the peak numbers seen near Willow Run.

There is still very much to be learned of the distribution of this little skipper in North America. We know nothing as yet of its northward limits. Mr. THOMAS' surprising record (based on a series, not on a single capture) near Columbus may well indicate that the species is spreading southward. Of this, too, we need more information and more records. Mr. MERGOTT'S captures near Buffalo and Niagara Falls may indicate an eastward extension of range actively in progress, or they may indicate merely a long-held territory. I rather incline to the former notion.

Should any one obtain additional records of this species, I should be most interested to learn of the details.

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SOME CONSIDERATIONS ABOUT AN ABDOMINAL ORGAN IN CERTAIN TORTRICIDÆ MOTHS

By NICHOLAS S. OBRAZTSOV*

In 1952, Dr. A. DIAKONOFF described a peculiar abdominal organ which he observed in a new genus of the Tortricidæ from New Guinea, and which he believed had not previously been discovered. In 1953, the above author named this new genus *Tremophora,* and considered it as allied to *Tæniarchis* Meyr. As one of the distinguishing features of *Tremophora,* the author mentioned: "Abdomen in both sexes with a pair of dorso-lateral moderate reniform openings on first segment, being terminations of a paired abdominal sense organ."

In a supplementary note, DIAKONOFF (1955) described the above organ in detail, and figured it. He wrote: "The genus *Tremophora* differs from all its allies, and, as far as I know, also from all other Lepidoptera, in possessing the above mentioned peculiar organ in the tergite of the second abdominal segment. It consists of a paired, rather deep excavation of the segment, externally having the appearance of two rather large, somewhat kidney-shaped holes with slightly elevated edges, situated towards the anterior edge of that segment, with their long axis directed longitudinally. The excavations penetrate downwards and slightly forwards, each forming a short blind tunnel with a thick, sclerotized, and apparently smooth wall. These organs, which I called the "dorsal organs," are present and are equally developed in both sexes; their superficial appearance is similar in the six known species of *Tremophora.*"

At first, DIAKONOFF supposed those organs as possibly "being a kind of tympanal organ of peculiar construction," but no indication of the presence of a membranous portion was found. An histological study of the organs was rather disappointing: "No traces of neural elements could be found in the sections; neither did the structure of the sclerotized walls of the cavities provide any indication as to the function of the dorsal organs." It was less probable to explain those organs as scent organs with a mysterious function, because prior to this the true scent organs in the Lepidoptera were usually found built differently in the male and the female.

"It was suggested to me," DIAKONOFF wrote further, "that the dorsal organs might be the equivalents of the so-called mite chambers of certain Hymenoptera (e.g. *Xylocopa, Mesotrichia*), cavities of the body of special structure, inhabited by peculiarly specialized Acari. However, I have never observed any trace of mites in these organs; moreover, mite chambers have never yet been recorded in Lepidoptera."

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*Done at the American Museum of Natural History, in connection with a research on the North American Tortricidæ genera, supported by a grant of the National Science Foundation.

In a conclusion to his note, DIAKONOFF expressed his regret that there was very little hope for *Tremophora* (or allied genera) that material suitably preserved for anatomical and histological purposes would become available soon. Without such material, the author did not see any possibility of solving the problem of the organs he discovered.

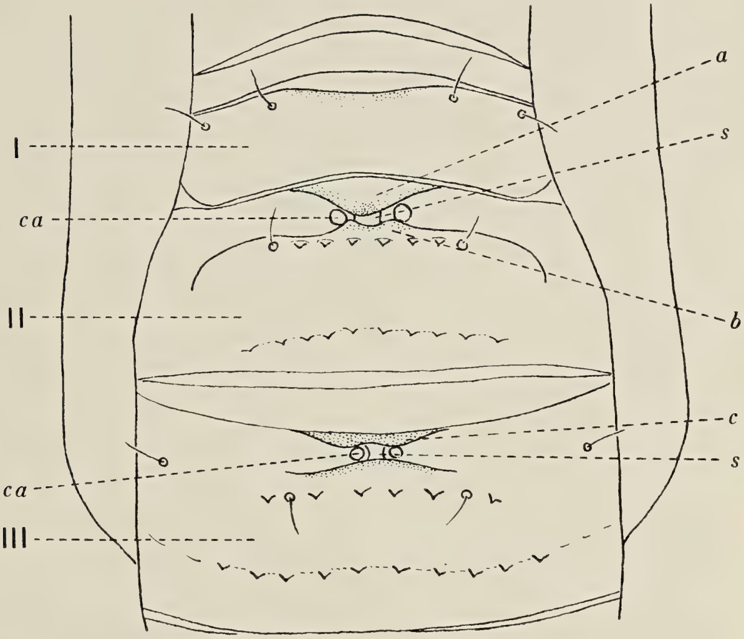
Unfortunately I have had no opportunity to see the *Tremophora* species described by DIAKONOFF, and they are known to me only from descriptions and figures. I believe nevertheless that the structures presented in some Holarctic Tortricidæ species are of the same nature as those in *Tremophora.* I observed similar cavities on the abdomen in many North American *Archips* Hb., e.g. in *argyrospila* Wkr., *georgiana* Wkr., *rosana* L., *negundana* Dyar, *striana* Fern., and *dissitana* Grote. In all these species the above cavities are present on the second abdominal tergite. There are among *Archips fervidana* (Clem.) and *A. semiferana* (Wkr.) specimens either with cavities or without. Most European *A. podana* (Sc.) have paired cavities not only on the second abdominal tergite but also on the third. In *A. cerasivorana* (Fitch), *A. infumatana* (Z.), and *A. purpurana* (Clem.) I could not discover any marks of such cavities at all. They are constantly absent also in *Pandemis* Hb., *Choristoneura* Ld., *Aphelia* Hb., *Clepsis* Gn., and many other Archipsini genera.

Very interesting is the presence of cavities on the third to eighth abdominal tergites in *Amorbia emigratella* Busck; in *A. cuneana* (Wlsm.) they are less developed. In *A. humerosana* Clem. the cavities have been observed usually on the third abdominal tergite, and in some specimens also on the fourth and fifth; in the latter case they are usually not so distinct. In other Sparganothinæ genera the cavities are found in *Cœlostathma* Clem. and *Platynota* Clem., but never in *Synnoma* Wlsm. or *Cenopis* Z.

Usually the cavities are reniform or round, situated at both sides of the middle line of the tergite. Occasionally they join together in some *Amorbia* specimens and form a common, much larger cavity. In most Archipsini and Sparganothinæ the entire cavity is smooth-chitinous, only rarely being completely covered with scales. The cavities are variously deep in some specimens of the same species, and give the impression of being caused by a pressure. A similar location of cavities in all the moths I studied suggested to me that these cavities might be explained as indentations caused by the texture of the inner surface of the pupal shell.

An examination of those exuviæ showed that in all species which possessed abdominal cavities in the moth stage, similar cavities were present also in the pupæ. The well-developed cavities of the pupæ corresponded exactly to those of the moths. On the other hand, the less developed cavities of the pupæ were never observed on the corresponding abdominal tergites of the imagines. The pupæ of certain Tortricidæ have the most well developed cavities usually on the second and the third abdominal tergites; likewise the moths. In *Archips fervidana* (Clem.) the cavities were not observed in all pupæ; they were also not found in all moths of this species. It is a very important observation that in *A. purpurana* (Clem.) the cavities are well developed in the pupa and absent in the imago.

The presence of those cavities in some Tortricidæ pupæ was already mentioned by MOSHER (1916) in a paper on the classification of the Lepidoptera, based on the pupæ. This author wrote about "prominent cavities" on the dorsum of the second and the third abdominal segments in the *Archips* pupa. There is no doubt that they were the cavities described below.



Dorsal view of basal part of pupal abdomen of *Archips argyrospila*
I, II, and *III* - first, second and third tergites; *a* - flanged plate of the first tergite; *b* - the same of the second tergite; *c* - the same of the third tergite; *ca* - cavities; *s* - screen between them.

The structure of the area bearing the cavities is, in the Tortricidæ pupa (see figure), more or less consistent in various species and genera which have such cavities. The postsegmental margin of the first tergite has a chitinous flanged plate (*a*) directed caudad. Near the presegmental margin of the second tergite there is another flanged plate (*b*), directed cephalad and usually less developed. Both plates are directed towards each other but do not touch each other. The area surrounded by those plates is deepened and raised gradually toward the sides of the tergite. In the middle of the whole excavation there is an elevated chitinous screen (*s*). It is situated lower than the flanged plates and is sometimes partly covered by them. At both sides of this screen there are two round cavities (*ca*) which correspond to those discussed above in some Tortricidæ moths. In case the screen is not developed, the cavities join together and form a common large cavity.

On the third tergite, the anterior flanged plate (*c*) is formed by a chitinous fold situated caudad from the presegmental margin of the tergite. In other respects the whole area with cavities resembles that on the second tergite, but the flanged plates are less developed. If the flanged plates and cavities are present on the following tergites, they are usually like those on the third tergite. A degradation of the flanged plates or their complete absence on the fourth and subsequent tergites is of usual occurrence.

It is difficult as yet to say anything definite about the significance to the pupa of the above chitinous structures around the cavities, or about the meaning of the cavities as such. If the flanged plates between the first and second abdominal segments in the pupa might prevent its excessive reclining dorsalward, they are useless for this purpose on the remaining tergites, because both plates are located there on one and the same tergite. Very probably, the flanged plates and the chitinous screen between and under them may serve for the purpose of strengthening the dorsal side of the pupa and its defence against any external pressure or impact. In both cases, the cavities might be explained either as former reservoirs of chitin used for strengthening the adjacent parts of the tergites, or as attachment places of some chitinous processes which were possibly present in ancestors and are absent in the recent pupæ. Finally, the whole chitinous area around the cavities might facilitate the moving of the pupa, as do the transverse rows of spines on tergites. Only a comparative morphological study of the various Lepidoptera pupæ and observations on living Tortricidæ pupæ might answer the above questions.

POSTSCRIPT

After the present note was sent to the publisher, a paper by G. C. VARLEY (*Ent. Mo. Mag.* 92: 107-108; 1956) on the same subject became available to me. The author describes and illustrates the structure of the same "abdominal organ" in the pupa of *Archips podana* (Sc.) which he calls "*Cacœcia oporana* L.", and mentions the presence of this "organ" in the pupæ of some other *Archips* species. The description given by VARLEY does not differ from mine except in terminology. Prof. VARLEY is inclined to see in the discussed "abdominal organ" a structure useful in pupal identification. The facts of individual variation of this "organ" in some Tortricidæ species, as I have mentioned in the present paper, diminish however the taxonomic value of this character.

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NOTES ON TEN NEW BUTTERFLY RECORDS FOR THE STATE OF MARYLAND

by ROBERT S. SIMMONS

For several years the author has been engaged in a concentrated study on the butterflies of Maryland. Many field trips have been planned in detail and made with the specific aim of collecting species heretofore unrecorded or unknown from the Maryland area. Occasionally, such a field trip is successful. The following notes represent ten species that have been captured on such trips and which have not been previously recorded from Maryland.

While on a field trip to western Maryland with Dr. CHARLES J. STINE on June 17, 1950. the author captured six *Hesperia sassacus* Harris and two *Polites mystic* Scudder. Both species were captured at the same two localities in Garrett County, elevation 2000 feet. These locations were Swallow Falls State Forest and an area near Friendsville. All the butterflies were captured along open paths through deciduous woods which were undergoing almost complete stripping by lumbering activities. Although many flowers were present, not one butterfly was seen near them. Of the *H. sassacus,* three were females and three were males. *P. mystic* presented two males. The forewing lengths of *H. sassacus* were as follows: ♀ 14 mm., ♀ 15 mm., ♀ 16 mm., ♂ 14 mm., ♂ 15 mm., ♂ 15 mm. The forewing lengths of both *P. mystic* were 14 mm.

On May 4, 1952, a field trip was planned to Gambrill State Park, near the city of Frederick, Frederick County, Maryland. The area represents the eastern boundary of the Blue Ridge Mountains in Maryland. The result of a day of collecting yielded one new butterfly, *Amblyscirtes hegon* Scudder. One specimen, a female with a wing expansion of 12 mm., was captured along a path in a semi-open mixed woods, on the crest of a ridge reaching 1600 feet.

On May 7, 1952, a field trip was made to the highest point in Frederick County, an area near Thurmont, along the Catoctin Ridge, which reaches 1917 feet. Arriving at this locality, the author found multitudes of flowering Spring Beauties (*Claytonia virginica* Linnæus.). Careful investigations revealed two *Pieris virginiensis* Edwards feeding on their blossoms. An intensified search was rewarded with the capture of six more specimens. Four were males and four were females. Forewing lengths were ♂ 21 mm., ♂ 22 mm., ♂ 22 mm., ♂ 22 mm., ♀ 18 mm., ♀ 19 mm., ♀ 21 mm., ♀ 22 mm.

The specimens were flying in a heavily wooded area which was semi-open at this time of year since the vegetation had not yet fully emerged. They would not hesitate to cross open fields, however. Feeding was done primarily on Spring Beauty (*C. virginica*) and Wild Mustard (*Brassica*) blossoms. Several females were observed ovipositing on the under-side tips of Wild Mustard (*Brassica*) leaves. Therefore, this is at least one of the food plants of *P. virginiensis* in Maryland.

On July 9, 1952, Mr. FRANKLIN H. CHERMOCK and the writer made an extensive field trip on the Del-Mar-Va Peninsula. Along U. S. Route 13, just north of the Maryland-Virginia line, we found an extensive open area teeming with flowering Indian Hemp (*Apocynum cannabinum* Linnæus.) A *Papilio palamedes* Drury was spotted and captured. The specimen proved to be a large fresh female with a forewing length of 65 mm. There have been several collectors who have reported sight records of this species in the Maryland area. Such records should be substantiated by a capture.

A field trip was made with Dr. WILLIAM A. ANDERSEN to Flintstone, western Maryland, on May 12, 1955. In a few hours of collecting we bagged four *Euchloe olympia* Edwards and four *Glaucopsyche lygdamus nittanyensis* F. H. Chermock between us. The author captured a lone female of *A. hegon* with a forewing length of 13 mm. Every specimen was captured along the crest of a high ridge, elevation 1200 feet, which was composed of mixed woods varying in density. The *E. olympia* and *A. hegon* were all captured in flight, while the *G. l. nittanyensis* were all netted on Wild Pea (*Lathryus maritima*) blossoms. The forewing lengths for *E. olympia* were ♂ 17 mm., ♂ 18 mm., ♂ 20 mm., ♀ 19 mm. Forewing measurements for the *G. l. nittanyensis* were ♀ 13 mm., ♀ 14 mm., ♀ 15 mm., ♂ 14 mm.

A field trip was made on June 16, 1955, in company with Mr. J. E. SIMMONS to the Del-Mar-Va Peninsula. A low lying area at the edge of a dense deciduous woods was found near Linkwood in Dorchester County. Flowering Indian Hemp (*A. cannabinum*) was everywhere. A fresh female *Atlides halesus* Cramer was observed on a blossom and, after some effort, captured. Further collecting yielded no more. This specimen had a forewing length of 20 mm.

July is usually a good month for hairstreaks in Maryland. It was suspected that if a more virgin territory would be investigated a species which has continually eluded my capture might be found. This butterfly is none other than *Strymon edwardsii* Grote & Robinson. Although some authorities comment on its relative abundance, I have found it exceedingly rare in the Maryland area. Time after time of diligent searching in scrub oak areas has only resulted in the capture of its cohort *Strymon falacer* Godart.

On July 5, 1955, in Frederick County, I decided to try an extensive area of scrub oak which grew on a rocky mountain where the vegetation has been unmolested for years — perhaps centuries. The soil is so poor and rocky that the trees remain dwarfed, thereby never growing large enough to lumber. A day's collecting here yielded ten fresh female *S. edwardsii.* The area was visited again three days later and fifteen more were captured. Ten of these were released after examination. An odd fact about this find was the apparent absence of males. Most of the specimens were netted directly off of the scrub oak trees. They usually rested in the middle of a leaf, six to 8 feet off the ground, rolling their hind wings in typical hairstreak fashion. There were no flowers of any kind in the area. The forewing lengths were as follows: 1—13 mm., 2—14 mm., 5—15 mm., 2—16 mm., 2—17 mm., 3—18 mm.

Since *S. falacer* is a relatively common form, other Maryland collectors might have *S. edwardsii* mixed in with them unknowingly. However, it has been my experience that it is anything but common in Maryland.

On July 26, 1955, a field trip was made by Dr. ANDERSEN and the author to western Maryland. While investigating a small bog beside a hawthorn thicket, we noticed a butterfly which resembled a Crescent while in flight. Upon capturing the specimen, we found it to be a Metalmark, *Lephelisca borealis* Grote & Robinson. A further intensified search yielded a total of six specimens between us. The area was definitely a low-lying bog at the base of a steep hill and quite damp. Continued collecting on the hill itself and on its very crest proved even more fruitful. A few hours time netted a total of fourteen more specimens between us. Most of the individuals captured were in more open areas. However, some were taken in extremely dense undergrowth and many would not hesitate to fly into such places when disturbed. These butterflies were observed feeding on two kinds of wild flowers — the large yellow flower of a composite and the white blossoms of Indian Hemp (*A. cannabium*).

The altitude of the ridge was 1200 feet. The flight of this butterfly was not very swift, and when once sighted, it could usually be captured. The forewing measurements were: 2 ♀♀—12 mm., 2 ♀♀—13 mm., 9 ♀♀—14 mm., 1 ♀—15 mm., 1 ♂—13 mm., 2 ♂♂—14 mm., 2 ♂♂—15 mm., 1 ♂—16 mm.

Briefly summarized, the records are as follows:

SPECIES	DATE	LOCATION
Hesperia sassacus	VI-17-50	Swallow Falls State Forest, near Friendsville, Garrett County, Maryland
Polites mystic	VI-17-50	Swallow Falls State Forest, near Friendsville, Garrett County, Maryland
Amblyscirtes hegon	V-4-52	Gambrill State Park, Frederick County, Maryland
	V-12-55	Near Flintstone, Allegany County, Maryland
Pieris virginiensis	V-7-52	Thurmont, Frederick County, Maryland
Papilio palamedes	VII-9-52	Beaverdam, Worcester County, Maryland
Euchloe olympia	V-12-55	Flintstone, Allegany County, Maryland
Glaucopsyche l. nittanyensis	V-12-55	Flintstone, Allegany County, Maryland
Atlides halesus	VI-16-55	Linkwood, Dorchester County, Maryland
Strymon edwardsii	VII-5-55	Gambrill State Park, Frederick County, Maryland
Lephelisca borealis	VII-26-55	Flintstone, Allegany County, Maryland

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ADDITIONAL *BOLORIA TODDI* RECORDS FROM MARYLAND

E. G. MacLeod (*Lepid. News* 9:54; 1955), reporting Maryland records of *Boloria toddi* (Holland) obtained in the past few years, suggests that they may indicate a southward extension of the range subsequent to 1932. It therefore seems desirable to record some earlier observations. The files of the Department of Entomology of the Natural History Society of Maryland include records of this species from Riderwood, Baltimore County, taken by F. S. Haydon in May 1930 and on 2 and 11 August 1932. A record from Herring Run Park, Baltimore, is attributed to E. Gretsky. On 17 June 1932 I took one specimen on clover in marsh grass near the shore of an inlet on the north side of the Loch Raven Reservoir, Gunpowder River, Baltimore County. This specimen and the three taken by Haydon are in the collection of the N.H.S.Md. in Baltimore where I examined them on 14 January 1956.

The addition of these records to those given by MacLeod provides occurrences of record in each county of Maryland along the "Fall Line" from the Susquehanna to the Potomac River. Until records are reported from other sections of Maryland, the possibility is suggested that the occurrence of *B. toddi* is limited to the lower edge of the Piedmont Plateau in Maryland.

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THE USE OF THE LEITZ "ULTROPAK" MICROSCOPE FOR STUDYING THE SCALES OF LEPIDOPTERA *IN SITU*

As noted by B. C. S. Warren (*Entomologist* 84:73; 1951) a major difficulty in using the form of the androconia or any other type of scales as a taxonomic character is the possibility of the contamination of mounts by material from other specimens. This difficulty is readily avoided by examining the scales *in situ* by reflected light through the use of high magnification (72×) in an ordinary dissecting microscope, or, preferably, of the Leitz "Universal Ultropak" microscope. The latter instrument, by means of a built-in source of illumination, permits observation by reflected light under relatively high magnification. In the study of certain species of *Erebia* it was found that androconia are plainly visible *in situ* through the "Ultropak" at 110×. If the wing of the specimen is at certain angles, the androconia may be difficult to see; therefore several different observations should be made (*i.e.,* equivalent areas on opposite wings) before conclusions are drawn. After some experience is gained with the "Ultropak" the scales may be seen fairly readily under the dissecting microscope. Examination of scales *in situ* is fast, sure, and does not damage the specimen. It permits accurate determination of the distribution of the various types of scales, but has the disadvantage of not permitting detailed examination of the scales themselves. Other entomological uses for the "Ultropak" are numerous; it should be considered whenever a situation calls for high magnification of opaque surfaces.

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TWO NEW RECORDS OF PENNSYLVANIA LEPIDOPTERA[1]

by HARRY K. CLENCH

1. *Mnemonica auricyanea* (Walsingham), Eriocraniidæ.

On 26 May 1956 Dr. G. E. WALLACE, Curator of Insects at the Carnegie Museum, captured a single fresh specimen of this species at the porch light of his home in Gibsonia, about 16 miles north of Pittsburgh (Allegheny Co.). The area about the house is a moderately settled suburban community, largely in lawns, truck gardens, orchards and the like, though with scattered trees of many kinds. Despite the rarity and strong localization of colonies of this species it is odd that it has heretofore eluded capture in an area as well collected as the Pittsburgh district, one of the rather few localities in the country in which "micro" collecting has been practiced both intensively and over a long period. The specimen agrees well with a small series in the museum collection from Rhode Island.

2. *Erora læta* (Edwards), Lycænidæ.

This often sought but seldom captured little butterfly has been taken both north and south of Pennsylvania, so its occurrence here was never seriously in doubt. On 3 May 1956, however, it was no longer a matter of conjecture. In the company of four colleagues from the museum (L. K. HENRY, botany; K. C. PARKES, ornithology; N. D. RICHMOND, herpetology; G. E. WALLACE, entomology) I took a single very fresh male while on a preliminary reconnaissance of the museum's newly acquired biological research area, the Powdermill Nature Reserve, located about 4 miles south of Rector, in eastern Westmoreland County.

The capture was made shortly after noon at the bottom of the Powdermill Run valley, very close to the stream itself, in the woods only a few yards from the edge of a large grassy clearing. In the immediate vicinity the forest was composed chiefly of beech, both old trees and young saplings. Underbrush was sparse, composed chiefly of the beech saplings and scattered clumps of rhododendron. Further upstream hemlock and birch (black and yellow) appear in quantity, along with various maples. On one slope of the adjacent valley area maples and beech occur; on the facing slope, largely a variety of oaks. No hazelnut was seen in the vicinity at all.

The specimen was taken on the ground, perched on one of the dead beech leaves that thickly carpet the area. It was very heavy bodied and appeared to have just emerged; it was so sluggish that it absolutely refused to fly up into the net.

The calendar date of capture does not indicate the time as well as is desirable and it is therefore pertinent to give here a few associated seasonal events, to fix the biological— or climatological— date more precisely. In view of the freshness and sluggishness of the specimen, and of its male sex, this would probably represent about the beginning of its spring flight period.

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[1] Contribution no. 1, Powdermill Nature Reserve of Carnegie Museum.

Among the butterflies only *Lycænopsis pseudargiolus* was seen — throughout the area in moderate numbers (10-15 individuals seen, mostly males), and had been on the wing, apparently, for several days. Among the plants *Trillium* (both *grandiflorum* and *erectum*) were beginning to flower — perhaps 30% of the buds being open; dogwood buds were still tightly closed; *Hepatica* had nearly finished flowering, though I saw one clump of three flowers in their prime; beech leaf buds were large but still tightly closed.

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NOMENCLATURE NOTICE

Notice is hereby given that the possible use by the International Commission on Zoological Nomenclature of its Plenary Powers is involved in an application relating to the under-mentioned name included in Part 11 of Volume 12 of the *Bulletin of Zoological Nomenclature,* which was published on 30th November 1956:

PIERIDÆ Duponchel, 1832, validation of family-group name (Class Insecta, Order Lepidoptera) (Z.N.[S.]289).

Notice is also given that the possible use by the International Commission on Zoological Nomenclature of its Plenary Powers is involved in an application relating to the under-mentioned names included in Part 1 of Volume 13 of the *Bulletin of Zoological Nomenclature,* which was published on 25th January 1957:

Bithys and *Chrysophanus* Hübner, 1818 (generic names of neotropical Theclids), suppression of (Class Insecta, Order Lepidoptera) (Z.N. [S.] 802).

Any specialist who may desire to comment on the foregoing applications is invited to do so in writing to the Secretary to the International Commission (Address: 28 Park Village East, Regent's Park, London, N.W.1, England) as soon as possible. Every such comment should be clearly marked with the Commission's File Number as given in the present Notice, and sent *in duplicate.*

If received in sufficient time before the commencement by the International Commission of voting on the application in question, comments received in response to the present Notice will be published in the *Bulletin of Zoological Nomenclature;* comments received too late to be so published will be brought to the attention of the International Commission at the time of the commencement of voting on the application in question.

The period within which comments on the applications covered by the present Notice are receivable is a period of six calendar months calculated from the date of publication of the relevant Part of the *Bulletin of Zoological Nomenclature.* In consequence any comments should reach the Secretariat of the International Commission at the latest by 30th May and 25th July 1957, respectively.

FRANCIS HEMMING
Secretary to the International Commission
on Zoological Nomenclature

ESPECIALLY FOR FIELD COLLECTORS

(Under the supervision of JAMES R. MERRITT)

LEPIDOPTERA COLLECTING AT RANKEN, MISSOURI

by EDWIN P. MEINERS

The favorite collecting grounds of our entomologists of an earlier day were limited largely by their accessibility by street car or train or, on occasion, by long hikes. So we come to find certain areas to have been more or less common meeting grounds for persons of like tastes. A few of these early collecting grounds in the St. Louis area have become well known, as their names have not infrequently appeared in the literature. Creve Coeur Lake (Akerlind, 1907), about 15 miles northwest of St. Louis, is a natural lake formed by the backwater of the Missouri River, bordered on the south by hills and bluffs. Cliff Cave, along the Mississippi River, about four miles south of Jefferson Barracks, is a locality where certain migrant butterflies, such as *Eurema mexicana* and *Agraulis vanillæ,* coming up the Mississippi flyway were to be found at times. Meramec Highlands (Heink, 1913; Dean, 1918) is an area of hills and ravines bordering the Meramec River, about 20 miles southwest of St. Louis, where *Papilio marcellus, Incisalia henrici, Strymon m-album, Anthocaris genutia,* and *Euchloe olympia,* as well as numerous species of the genus *Catocala,* have been taken.

With the advent of the automobile more remote regions have been explored, and so we find that, for many years, the favorite collecting ground of the entomologists of the St. Louis area has been a locality known to the local naturalists as "Ranken" or "The Ranken Estate." Ranken is an area approximately five miles square, located in the extreme southwestern portion of St. Louis County about 25 miles from the heart of the city of St. Louis. It lies at the northern fringe of the Ozark country and is bounded partly on the north and the west by the Meramec River. The terrain is made up of a broad ridge which divides the area into two wide and fertile valleys. This main ridge divides and subdivides into a series of lesser ridges which spread out, finger-like, to form smaller valleys, ravines and hollows, all of which have been a paradise, not only for the entomologist, but also for those interested in the other branches of natural history.

Every hollow and valley has its own creek, most of them intermittent in flow, which are eventually drained through underground passages, as is evidenced by the numerous springs in all of the valleys. During the dry season the creeks become dry or almost dry, the largest, Antire Creek, becoming a series of pools within the broad expanse of the dry gravel creek bed. The hills average between 250 and 350 feet in elevation above the Meramec River and consist of a limestone base, a ledge of which forms an outcropping on many of the ridges. The upper portion of the ridges is almost entirely chert-covered.

The area is nearly all forested with the exception of the fertile valleys that are under cultivation. The forest is principally an oak—hickory association with a considerable admixture of Sugar Maple, Walnut, Ash, Elm, Honey-locust and Hackberry along the lower slopes and ravines, while Sycamore, Willows, and Cotton-woods grow in the valleys and along the creeks. There is a considerable invasion of Red Cedar along the lower slopes, and here in spring we find numbers of *Mitoura gryneus* gyrating among the topmost branches but occasionally coming down within reach of the net. A second brood, representing the dark form "smilacis," appears early in July.

The outcropping ledge of limestone.

The ledges and lowermost slopes of the ridges are covered with Red-bud (*Cercis canadensis*), a common denizen of the entire Ozark region, which sets the hills ablaze with rosy color early in spring. There we find *Incisalia henrici* frequenting the flowers or ovipositing upon the leaf buds. Another early spring butterfly that we find in the open woods along the lower slopes and which is looked upon as a prize by the collector is *Anthocaris genutia,* which may on rare occasions be found in considerable numbers.

Pawpaw grows along the edge of the woods at the foot of the hills, usually at the opening of the ravines or hollows, while everywhere we find Sassafras in abundance adding color to the autumn woods. Wild Cherry is fairly common, and occasionally we find Wafer-ash (*Ptelea trifoliata*). Wild Ginger grows in abundance in the ravines. Along with these plants we find the following butterflies: *Papilio marcellus, troilus, glaucus, cresphontes* and *philenor. P. troilus* is by far the most abundant of our Swallow-tails, frequently sipping moisture at the edge of the creek or pools, and in one year of drought we found them in swarms of hundreds at the few moist places available, together with numerous specimens of *glaucus* and *marcellus*. *P. cresphontes* is one of our scarcest papilios, though not exactly rare.

A creek bed at Ranken, nearly dry in mid-summer.

The tops of the highest ridges are covered with chert and vegetation is rather sparse. Rock Cress (*Arabis viridis*) is found growing here in this cherty soil in small groups. This is the habitat of *Euchloe olympia,* which flies from the end of March through April, the caterpillars feeding upon the Rock Cress (Meiners, 1939; Arnhold, 1952). It was found that *Arabis viridis* grows only where the soil is extremely rocky, while only a few feet from the top, where there is less exposure of the chert, none of the plants are to be found. The eggs are laid principally upon the buds, only a few being found upon the leaves, and from one to a dozen eggs are laid upon each plant. *E. olympia* is typically a hilltop denizen, being found plentifully where *Arabis* is growing. A few individuals will sometimes migrate to the lower slopes, and when found, have led to its being considered a rare species by most local entomologists; few collectors make the strenuous climb to the ridge tops.

A common plant found growing along the roadsides and in waste places throughout the entire Ozark region is the Goatweed (*Croton capitatum*). This is the food of *Anæa andria*, one of our commonest butterflies. *A. andria* is double-brooded in this region, being most plentiful late in summer and early in autumn, frequently being found in numbers around the decaying fruit of the Persimmon trees. It hibernates in the imaginal state and is often found flying on warm, sunshiny days in mid-winter (Rowley, 1891).

In late summer the fields are covered with Iron-weed, Joe-pye-weed, Blue Vervain, *Eupatorium,* Field Aster, and others, which attract many kinds of butterflies. *Colias eurytheme* is especially abundant at this time of the year, its orange color being particularly conspicuous in the fields of white flowers. At one time, and within my memory, *Colias philodice* was our commonest butterfly, congregating by the hundreds at roadside puddles following a summer shower, while *C. eurytheme* was considered a collector's prize. This has been completely reversed within my 50 years of collecting, *philodice* being now all but exterminated by the more aggressive *eurytheme* (Clark, 1931).

I have records of about 86 species of butterflies, with their many variations, seasonal forms, etc., taken at Ranken. Among some of the rarities I might mention *Eurema mexicana, Agraulis vanillæ, Phyciodes phaon, Polygonia progne, Strymon ontario, Strymon liparops,* and *Hemiargus isola.* Although *Cercyonis alope, Euphydryas phaeton,* and *Calephelis muticum* are not especially rare, they are usually found only in a few isolated areas and are considered prizes when taken.

I will mention only a few of the more conspicuous moths that we have taken at Ranken. From early spring into midsummer we find *Hemaris thysbe* and *H. diffinis* flying abundantly during the day time. These moths are double-brooded, the larvæ commonly found on Buck-bush (*Symphoricarpos orbiculatum*), a low shrub growing profusely throughout the entire Ozark area. *Amphion nessus,* another day flying sphinx, is taken rarely and is a prize. Beds of Bouncing Bet (*Saponaria officinalis*), escapes from nearby gardens, attract a number of sphinges, commonly *Phlegethontius sextus* and *P. quinquemaculatus, Dolba hylæus* (larva on Pawpaw), *Ceratomia undulosa, Atreides plebeja, Cressonia juglandis, Ampelœca myron, Darapsa pholus, Xylophanes tersa,* and *Celerio lineata,* the latter our most common sphinx.

Of the Saturniidæ *Platysamia cecropia, Actias luna,* and *Telea polyphemus* are common. *Automeris io* is not found as frequently with us as it is further south. *Hemileuca maia,* occasionally met late in fall, is a swift flyer and difficult to capture. *Callosamia promethea* was at one time extremely common, and bushels of the cocoons could be gathered from the low Sassafras shrubs where they formed conspicuous objects after all of the leaves had fallen. It has now been many years since I have seen *promethea* in St. Louis County, and I had about come to the conclusion that the species had been exterminated, probably by parasites to which it is exceptionally prone, had I not found two empty cocoons on Sassafras during the fall of 1955 not far from Ranken.

The most interesting moths taken at Ranken, however, belong to the genus *Catocala,* of which I have records of 37 species with their many variations, and there may be others that I have failed to find. Every ravine and hollow is a happy hunting grounds for these gorgeous insects during their season of flight, which begins about the middle of June and extends to nearly the end of August. Daytime collecting (Rowley, 1906) has always been our method of choice, and with a sharp eye and a stealthy step it is possible to approach and capture them with the cyanide jar and without the use of the net. One must, however, choose the proper kind of a day for successful collecting. A stuffy, humid, hot day in July or early August with a storm not far in the offing gives the best results. I have notes of such a day early in August of 1931 that was a record for me. It was an unusually hot and humid day, dark clouds were beginning to form in the west, and the rumble of distant thunder could be plainly heard. It was about 3 o'clock in the afternoon when I, together with several members of my family, entered one of the hollows, each armed with cyanide jars. Imagine our surprise when we found *Catocala* flying like bees around a hive. Every tree trunk had one to a dozen specimens on it, but all were alert and extremely wary. If we bottled one specimen the others immediately took off. But there were others on the next tree and the next, and we bottled them as fast as the cyanide would stun them. About 5 o'clock the storm was upon us and we had to scurry for shelter. Later, when we added up our captures, we had a hundred specimens representing 18 species. Following the storm we had a week's respite from the summer's heat. Returning the following Sunday there was not a single *Catocala* to be seen. The day was comparatively cool and clear!

A *Catocala* hollow at Ranken, home of many species.

Some of the commonest species found at Ranken were: *Catocala innubens*, *lacrymosa*, *neogama*, *ilia*, *epione*, and *amica*. Among the relative rarities we found *C. consors, angusi lucetta, mæstosa, nebulosa, sordida, judith, coccinata,* and *serena.*

Some years ago lumbermen entered this region and many of the fine old oaks fell to their ax. Later a national highway traversed the area and with it came automobiles and picnickers. More recently the Boy Scouts have taken over a considerable portion of it and added many modern "improvements." Ranken as we knew it is no more, but there are still many wooded hills and deep ravines where one can find rare butterflies and *Catocala.*

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FOOD PLANTS OF *PERO MACDUNNOUGHI*

In his recent revision of some western species of the genus *Pero*, RINDGE (1955, *Amer. Mus. Nov.* 1750: 33 pp.) makes the following statement: "The food plants are but little known, and it is possible that some of these species feed on more plants than are now known." This is quite true with *Pero macdunnoughi* Cassino & Swett, which feeds on at least two other plant species besides Privet mentioned by COMSTOCK (*Bull. So. California Acad. Sci.* 29: p.29; 1930) in his life history description.

In November 1941 I obtained some eggs from a confined female of this species. The newly-hatched larvæ refused to eat several species of plants offered them, but fed readily on foliage of *Artemisia californica* Less. and were reared to maturity on it.

In July 1955 eight ova were found laid in a row along the edge of a leaf of *Eriogonum fasciculatum* Benth. Four of the larvæ from this batch of eggs were reared to maturity. The adults which emerged in November were typical *P. macdunnoughi.*

Since the only published food plant record lists an introduced plant, this report of two native host plants should be of some interest.

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DISTRIBUTION OF BUTTERFLIES ON VANCOUVER ISLAND

by Richard Guppy

The distribution of Rhopalocera on Vancouver Island is definitely unusual, and provides therefore some food for thought. The greater part of the population of butterflies is concentrated in the southeastern part of the island. Here the number of species and individuals is probably about average for a temperate climate, while in much of the western and northerly sections butterflies are very scarce and represented by few species.

At first glance an obvious explanation for this phenomenon seems right at hand. On maps showing the life zones of the Pacific Coast of North America, the area of V.I. where most Rhopalocera are found is set aside, not only from the remainder of the island but from all of the Pacific northwest, as a distinct zone. But unfortunately for this theory there is not the same sharp delineation between butterfly-occupied and butterfly-less areas, as there is between the gulf island zone and the coastal rain forest which covers the remainder of the island.

It is most fortunate that there exists a collection of Rhopalocera of the west coast of V.I. The owner of this collection makes no pretence at a serious study of Lepidoptera. He has collected these specimens at odd times over a number of years. No doubt he would himself be the first to admit that it was not much of a task, owing to the fewness of the species available. Yet I consider the effort most definitely worth while; without it we would not have any knowledge of the butterflies of the V.I. west coast.

Following is the complete list of species included in the above collection; I have listed all the *Polygonia* species found on V.I., and I expect they all occur on the west coast, though I cannot identify specimens myself with certainty: *Papilio zelicaon, P. eurymedon, Neophasia menapia, Pieris rapæ, Danaus plexippus, Polygonia satyrus, P. faunus, P. oreas, P. zephyrus, Nymphalis californica, N. milberti, N. antiopa, Vanessa cardui, Vanessa carye, Limenitis lorquini, Incisalia iroides, Lycænopsis pseudargiolus.*

Now I think we can explain the presence of every one of the above species on the basis of food plant availability. Briefly then, the scarcity of butterflies in the rain forest area seems to be due to the small selection available, before the coming of civilization, of those plants commonly used by butterflies as food, coupled with the reluctance of many species to move abroad in search of fresh pastures.

Papilio zelicaon feeds on *Heracleum lanatum,* which grows abundantly on the rocky headlands along the open coast. The host of *Neophasia menapia* is *Pinus contorta,* a common tree in the low sandy areas. *Papilio eurymedon* and *Limenitis lorquini* feed on deciduous trees which find a foothold beside lakes and rivers. Where clearing has allowed the spread of such trees, the butterflies have followed. *Lycænopsis pseudargiolus* probably uses as a host *Spiræa douglasii,* which grows abundantly in the shallows of lakes. Being like all Lycænidæ a stay-at-home, it has not followed the clearings and on the west coast is still confined to a few favored spots beside bodies of fresh water. *Incisalia iroides* feeds on *Gaultheria shallon,* the usual ground cover in all of the rain forest. The remaining species on the west coast list are wanderers and strong fliers, which are sure to locate their host plants where-ever these may spring up, or, as in the case of *Nymphalis californica* and *Danaus plexippus,* they migrate far beyond their breeding range.

It may seem that I am painting the west coast as something of a desert, since only a dozen or so of nearly sixty species of butterflies can find suitable hosts there. But it must be remembered that the Rhopalocera constitute relatively few groups, and the species in each group tend to have a similar taste in food plants. Nearly all the Satyridæ like grasses. On V.I. at least, the Plebeiinæ are almost confined to lupins, while *Speyeria* and *Boloria* care only for violets. Space will not allow me to go further into the matter from this direction; we must consider a few species which certainly find hosts on the west coast, but which do not seem to occur there. *Papilio rutulus* usually flies with *P. eurymedon.* Being difficult to net and looking on the wing much like others of the genus, it could easily get overlooked. *Incisalia eryphon* feeds on *Pinus.* It is another insect which could easily escape notice. On the east coast one has little chance of obtaining specimens without previous knowledge of the exact spots where colonies may be found. The presence of stands of *Pinus* is no guarantee that *I. eryphon* will be be found there also. One circumstance frankly puzzles me. The masses of magnificent *Lathyrus* which cover the ocean beaches between forest and tide should certainly harbour *Everes amyntula.* I found this species common at Kelsey Bay, on the east coast, but far north of the benevolent gulf islands zone.

We can now turn for a while to the butterflies of the east coast, where some sixty species are found. Here also, much of the country was originally too heavily wooded to allow of much butterfly life. Ignoring for the moment the man-made clearings, there are found three types of terrain which provided a favourable environment: (1) the dry southern tip of the island, which appears never to have supported a continuous growth of timber; (2) rocky areas where the soil is too thin to support large trees; (3) mountains above the timber line.

The park-like country around Victoria is evidently the headquarters of the island butterfly population. There are several species which still are found there, though not elsewhere on the island. *Cœnonympha inornata* is one of these. Here it is represented by a subspecies, *C. i. insulana,* whose entire range is confined to this tiny bit of territory. *Euphydryas editha taylori,* extremely abundant some seasons in the park land around Oak Bay, is said to occur also at Comox. Another species which seems to have established itself around Victoria without wandering further north is *Phyciodes campestris.* A form of *Hesperia comma* also has become numerous in the Oak Bay park of recent years, but I have taken a solitary specimen of *H. comma* at Cameron Lake, and another on Mt. Benson near Wellington. It seems likely in view of the sudden "eruption" of *H. comma* around Victoria, that it may spread rather rapidly, but by 1956 it had not spread at all.

Another subspecies of some interest is *Plebeius sæpiolus insulanus.* Most probably a lupin feeder, the V.I. population as far as is known is confined to Mt. Malahat. This is the more strange since three other lupin-eating species are found nearly everywhere that their host plant grows, though there are some notable exceptions. On Mt. Benson for instance, there appear to be only *Glaucopsyche lygdamus* and *Plebeius icarioides.*

The above few species complete the list of those which have been satisfied to occupy the southern tip of the island only. A number of butterflies have moved northward, taking advantage of stony hillsides which can support only scattered trees, and most of these have established themselves on the high peaks above timber line.

To the specialist in Rhopalocera, alpine collecting on V.I. is not particularly rewarding. Several species supposed to be adapted to high altitudes I have not found above 3000 ft. *Parnassius clodius* is one of these. *Œneis nevadensis* occurs high up, but not so commonly as at moderate elevations. Probably the best spot on the island for this species is near my home, a rocky area close to the sea and only a few hundred feet above it. We have only two species which can be described as strictly confined to high altitudes. *Plebeius aquilo* I have only found on Mt. Arrowsmith above the 5000 ft. level. It has been collected on Mt. Becher at about 4500 ft. These are still the only known localities on V.I., but in fact they are the only alpine areas which have been visited by lepidopterists. Mt. Becher is a part of the Forbidden Plateau, where most high altitude collecting is done, because of the tourist accommodation provided by the lodge near by. I have myself tried Mt. De Cosmos near Nanaimo. On two occasions I climbed nearly to the summit of the 4000 ft. mountain, without collecting anything worthy of note. Our other high level species is of particular interest, because its presence remained unsuspected until 1950. Mr. LLEWELLYN JONES collected the first V.I. specimens of *Parnassius smintheus* that summer. It is a matter for speculation how it escaped the notice of earlier collectors. Its general resemblance to *P. clodius* could have caused it to be overlooked by some, not given to chasing every butterfly that showed up. However, as I have intimated, most of the high mountains of V.I. are still quite unexplored, let alone by butterfly enthusiasts, so the colony could easily have built up somewhere else and only recently been transferred to Mt. Arrowsmith. *Lycæna mariposa* is found on Mt. Arrowsmith and over much of the Forbidden Plateau. The glamour was somewhat taken out of this butterfly by Mr. JONES, who found a colony by the highway near Port Alberni. I do not know the exact elevation of this spot; it cannot be more than 1500 ft.

In conclusion I must remark on several species known to collectors all over the world, but which on V.I. are always rather scarce. Why this should be I do not know. *Vanessa atalanta* seems to occur only as a straggler. *V. cardui* sometimes comes in numbers on migration, but as the winter kills them, the species is absent most seasons. *Nymphalis antiopa* is said to be common at times, but I have never found it so. I have come across only one specimen of *Pieris napi. Danaus plexippus* is recorded for V.I. on the basis of a single specimen taken by my brother at Tofino.

Wellington, V. I., B. C., CANADA

MINUTES OF THE THIRD PACIFIC SLOPE MEETING OF THE LEPIDOPTERISTS' SOCIETY, AUGUST 4 and 5, 1956

Through the kindness of Dr. COGGESHALL and his associates every facility was provided for the western meeting at the Santa Barbara Museum of Natural History. Members convened at 9:30 A.M. on Saturday, August 4, and were favored with exceptionally attractive headquarters and unusually fine weather.

The first hour was devoted to registration, to the renewal of old friendships, and to becoming acquainted with those who were attending the western meeting for the first time. After refreshments which the museum kindly furnished, the formal meeting began when Dr. COGGESHALL welcomed the group to Santa Barbara and extended the hospitality of the museum. He spoke of his long association with Dr. W. J. HOLLAND at the Carnegie Museum and called attention to collections of Lepidoptera on display or placed at the disposal of the members. Dr. JOHN ADAMS COMSTOCK in accepting his welcome expressed appreciation for the fine facilities provided and commended the museum for the excellent job it is doing in its field.

Dr. T. N. FREEMAN'S presidential address was read by Dr. COMSTOCK and is published in this issue. After completing program arrangements, members examined the collections on display among which were many strikingly beautiful exotics. The group adjourned to a very enjoyable luncheon as guests of the Board of Trustees of the museum. Following this pleasant interlude the group picture was taken by Mr. FINLEY, museum photographer.

The afternoon was devoted to a symposium on the taxonomy of Lepidoptera. Dr. WILLIAM HOVANITZ was moderator, and the participants were Dr. R. H. T. MATTONI, Prof. KODO MAEKI, Mr. F. MARTIN BROWN, DR. J. A. COMSTOCK, and Dr. HOVANITZ. The substance of each paper will be published in an early issue of the *News,* and comments are therefore omitted from these minutes.

A large crowd enjoyed the evening banquet in the Red Room of the quaint and colorful Restaurante El Paseo. From there the group convened in the home of Mr. and Mrs. DEAN BLANCHARD, who were most gracious hosts to a large group of members and guests. Highlights of the evening were LLOYD MARTIN'S fascinating talk on Arizona collecting which was illustrated by many beautiful colored slides, and an inspection of Mr. BLANCHARD'S remarkable hummingbird collection.

Under Dr. COMSTOCK'S able chairmanship the Sunday meeting began with a report by Dr. MATTONI covering novel field studies on *Philotes sonorensis* undertaken in cooperation with Mr. MARVIN SIEGER. The numbers and distribution of individuals was determined by establishing six stations in San Gabriel Wash twelve miles east of Pasadena. Over 1100 specimens were marked and released in a manner explained and illustrated by colored slides. Recaptures numbered 258 specimens from which a number of conclusions about densities, sex ratios, and movements were drawn.

FRANK SALA then showed how the camera may be used as a taxonomic tool in recording life history stages. He showed numerous beautiful slides of California Pieridæ and other species. Dr. LELAND BROWN, author of the article on insect photography in the *Lepidopterists' News* (Vol. 7: p.148), assisted in taking these fine pictures. Group discussion centered around diapause in Lepidoptera.

Members then inspected the Hall of Insects which is under construction at the museum. Mr. NELSON BAKER explained the techniques he is using, and some of the problems he is having in displaying to the general public the remarkable adaptations of insects. Several attractive habitat groups are being prepared.

Mr. DAVID BAUER then gave a comprehensive and interesting report on his studies of the new world Melitæinæ. Careful genitalic studies of the American and European members of this subfamily show that the nearctic species are in need of generic rearrangement. There was considerable discussion by members on various species in this popular group.

The Mexican restaurant in El Paseo was once again the site where a large group of members and guests enjoyed lunch together. Following lunch the business meeting was advanced to first place on the afternoon program in consideration of those members who were travelling.

The first subject discussed was how to make better use of available automobiles in attending future western meetings. Those in Southern California who are driving and have extra room, and those who wish a ride are to leave word with LLOYD MARTIN in Los Angeles, while those in the San Francisco area will leave word with DON PATTERSON in Atherton. A motion requesting that consideration be given to the allocation of a portion of the dues of members in an area for support of regional meetings was passed and has been referred to Society officers.

Lengthy discussion ensued when the subject was broached as to whether the western group should organize further by drawing up a statement of aims and purposes. No action was taken. A motion was unanimously passed requesting the Society to notify the members at least six months in advance of the time and place of the national meeting. Fees of $28.00 collected at the meeting were sent to W. LEVI PHILLIPS to defray some of the costs of printed programs on a motion from the floor, and a resolution was passed thanking him for his excellent job.

A resolution was passed asking that the Society give consideration to the establishment of an Editorial Board to be chosen to represent the members of the Society, and to pass upon the merits of all material printed in the *Lepidopterists' News*. The secretary was instructed to express the appreciation of the group in letters 1) to the Museum Board of Trustees, and to Mr. and Mrs. DEAN BLANCHARD for their fine hospitality, and 2) to those who submitted papers *in absentia*.

The American Museum of Natural History field station in the Chiricahua Mountains of southeastern Arizona was selected after much discussion as the place for the 1957 western meeting over the Labor Day weekend, but since several members would be unable to attend, a second meeting in Santa Barbara sometime during October 1957 was also scheduled. NELSON BAKER was unanimously elected as program chairman for both meetings. Following a coffee break the hour was so late that it was decided to dispense with the balance of the scheduled program.

Members who registered were: RAY ALBRIGHT, NELSON BAKER, DAVID BAUER, J. A. COMSTOCK, CHARLES HILL, WILLIAM HOVANITZ, ROBERT KAISER, CARL KIRKWOOD, ROBERT LANGSTON, RON LEUSCHNER, LLOYD MARTIN, R. H. T. MATTONI, NOEL MCFARLAND, JOE MCKENNEY, PADDY MCHENRY, S. S. NICOLAY, PAUL OPLER, BILL PATTERSON, DONALD PATTERSON, ROBERT REID, WILLIAM REES, FRANK SALA, DORA SCHMELA, MARVIN SEIGER, ELTON SETTE, JOHN SPENCER, J. W. TILDEN, FRED THORNE, and PATRICK WILSON. Guests included Mrs. BAKER, Mrs. KIRKWOOD, Mrs. SALA, Mrs. THORNE, Mrs. TILDEN, Dr. COGGESHALL, and several others.

Respectfully submitted,
FRED THORNE
Secretary Treasurer, *Pro tem.*

The cover drawing of the stylized cossid moth on the current volume of the *News* is by HARRY K. CLENCH, curator of the Carnegie Museum in Pittsburgh.

REVIEWS

INVESTIGATIONS ON THE LEPIDOPTERA OF NEWFOUNDLAND. I. MACROLEPIDOPTERA. By Harry Krogerus. *Acta Zoologica Fennica* 82: 80 pp. 1954. Publisher: Societas pro Fauna et Flora Fennica, Helsingfors, Finland.

During three summer months of 1949, intensive studies were carried out by a four-man Finnish-Swedish biological expedition to Newfoundland (pronounced New/found'land'). The Macrolepidoptera portion of the investigations has been published in a well written, 80-page paper (in English) by the lepidopterist of the group, Dr. KROGERUS. 280 species are listed and discussed, comprising 247 encountered by the expedition plus 33 others reported in the literature but not observed in 1949. The ecological and zoogeographical aspects of the Newfoundland fauna are emphasized by the author, whose familiarity with similar climatic conditions in northern Europe provide an appropriate basis for comparison. This greatly enhances the value of his paper. It is divided into four sections: (1) Introduction, (2) Check List of the Newfoundland Species, (3) Taxonomical Remarks and Descriptions of New Species (with 34 text figures of genitalia), (4) A Survey of the Newfoundland Species. Section 4 is the actual list, with copious annotations, the arrangement essentially that of MCDUNNOUGH'S 1938 *Check List of the Lepidoptera of Canada and the United States of America. Part I. Macrolepidoptera.* Section 3 is largely occupied with discussion of relationships between Newfoundland and European populations of holoarctic species. A useful list of references appears at the end.

Dr. KROGERUS departs from the 1938 Check List in considering the following European and American forms conspecific (American name first): *Plebeius scudderi* (*Lycæides argyrognomon*) *aster* Edw. and *Plebeius idas* L., *Diarsia dislocata* Sm. and *Diarsia mendica* Fabr., *Leucania* [*oxygala*] *luteopallens* Sm. and *Leucania pallens* L., *Cucullia intermedia* Spey. and *Cucullia lucifuga* Schiff., *Septis finitima* Gn. and *Septis basilinea* Fabr., *Eupithecia luteata* Pack. and *Eupithecia lariciata* Frr., *Euphyia intermedia* [*ta*] Gn. and *Euphyia unangulata* Haw. He does consider, however, that racial differences exist in most cases. He regards *Graphiphora smithi* Snell. and the European *baja* Fabr. as distinct (thus at variance with FORBES, 1954); similarly with *Anagoga occiduaria* Wlk. and *pulveraria* Linn. (this time agreeing with FORBES, 1948).

Schrankia (*Hypenodes*) *turfosalis* Wocke is listed as a new occurrence for North America, but I should caution against adding the name to our lists until Newfoundland material is more thoroughly investigated. At least three different *Hypenodes* occur there, including two of my new ones described too late for inclusion in his paper.

Two new species are described by Dr. KROGERUS — *Protorthodes lindrothi* and *Hydrelia terræ-novæ,* and the types, which I have not seen, are in the Canadian National Collection.

Although trivial, the following few irregularities of usage and spelling should be noted:

Page 22: *Papilio brevicauda* is listed as a ssp. of *polyxenes* (spelled *polixenes*) as treated by ROTHSCHILD & JORDAN, and by JORDAN in Seitz, whereas in recent years it has most commonly been regarded as distinct.

Page 26: The generic name *Clossiana* Reuss is used for the bog fritillaries rather than *Boloria* Moore, but this is just a matter of opinion in choosing whether to use *Boloria* in its restricted or unrestricted sense.

Pages 8, 19, 69-70: *Xantorhoe* should read *Xanthorhoe,* as originally spelled (Hübner, *Verz. bek. Schmett.,* 327, 1816), and *congretata* Wlk. should read *congregata* Wlk.

Pages 9, 20, 71: *intermedia* Gn. should read *intermediata* Gn.

Two of Dr. KROGERUS' determinations have puzzled me. The first is *Alypia octomaculata,* known to feed only on Vitaceæ and therefore a seemingly doubtful inhabitant of Newfoundland. The other is *Abagrotis placida,* a rare species whose presence is possible but not otherwise recognized in the Atlantic Provinces.

All things considered, this paper deserves attention for its thoroughness, its awareness of holarctic zoogeography, and its value as the only comprehensive compilation of data on Newfoundland Macrolepidoptera.

To append a comment of my own, however, it would appear that we still have little more than a superficial knowledge of the Newfoundland fauna. In spite of extremely adverse weather, my 2-week sojourn to the Avalon Peninsula in mid-summer, 1954, yielded 40 species not encountered by KROGERUS, and this number included 27 not previously reported from Newfoundland in the literature. One might guess that further collecting would more than double the present list.

DOUGLAS C. FERGUSON, Nova Scotia Museum of Science, Halifax, N. S., CANADA.

MICROLEPIDOPTERA OF NEW GUINEA. Results of the Third Archbold Expedition (American-Netherlands Indian Expedition 1938-1939). Part III. By A. Diakonoff. *Verhandelingen der Koninklijke Nederlandse Akademie van Wetenschappen. Afd. Natuurkunde,* 2nd ser., vol. 49, No. 4: pp. (1)-164, figs. 373-551; 1954. — Part IV. *Ibidem,* vol. 50, No. 1: pp. (1)-191, figs. 552-719; 1954. — Part V. *Ibidem,* vol. 50, No. 3: pp. (1)-211, figs. 720-861, 1 title page; 1955. Amsterdam.

The publication of these three parts concludes a monumental work with altogether 900 pages and 861 figures in text, one separate plate, and one map (see reviews of Parts I and II in *Lepid. News,* vol. 7: p. 128, 1953, and vol. 8: p. 50, 1954). An enclosed title page and the index to the whole work enable it to be bound as a separate volume. Never before have the Microlepidoptera fauna of New Guinea been studied so accurately and on the level of recent scientific research. Although only the records of the Third Archbold Expedition are reported, the work includes review of 582 species and subspecies; of them, 514 species and 10 subspecies are described as new, and 67 new genera are established. Since keys to many Papuan genera and species, both those collected by the Expedition and others, are given, the work is a very important handbook for every student of the Papuan Microlepidoptera fauna. It is of great value for systematists and morphologists dealing with the Lepidoptera.

Part III brings descriptions and records of the families Schœnotenidæ, Childanotidæ, Carposinidæ, and Copromorphidæ, with new 13 genera and 105 species. To the family Schœnotenidæ a complete key to all known genera, also of other faunas, and a brief review of those genera, are given. This review, with many figures, gives a complete idea of the "newly born" family.

Part IV reports on the families Gelechiidæ, Cosmopterygidæ, Scæosophidæ, Xyloryctidæ, Stenomidæ, Œcophoridæ, Orneodidæ and Ægeriidæ. 15 genera, 119 species and seven subspecies are described as new.

Part V (the last of the work) reports on Heliodinidæ, Glyphipterygidæ, Elachistidæ, Scythrididæ, Yponomeutidæ, Amphitheridæ, Lithocolletidæ, Epermeniidæ, Plutellidæ, Lyonetiidæ, Tineidæ, Incurvariidæ, and Adelidæ, with 19 genera, 90 species and three subspecies described as new. It includes also a list of the entire Microlepidoptera records of the Expedition, general remarks on and the characteristics of the Microlepidoptera fauna of Central New Guinea, references, index to the whole work, *addenda* and *corrigenda,* and a title page with publishing data of separate parts of the work.

Henceforth, any study of the New Guinean Microlepidoptera fauna is indissolubly connected to the name of Dr. A. DIAKONOFF. His other papers have shown that he has further rich materials on this fauna. Owing to the author, the New Guinean Microlepidoptera are already studied immeasurably better than those of any other tropical fauna. Let us wish the author much success in the continuation of his interesting and important research of tropical Microlepidoptera.

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FAUNA SSSR. NASEKOMYE CHESHUEKRYLYE. VOLUME III, PART 2. CHEKHLONOSY-MESHECHNITSY (SEM. PSYCHIDÆ). [Fauna of the USSR. Insecta Lepidoptera. "Bag-worms."] By I. V. Kozhantshikov. Zoologicheskiy Institut Akademii Nauk SSSR. New series, no. 62: 516 (+ 1) pp., 334 figs. Publisher: Akademia Nauk SSSR. Moscow-Leningrad. 1956. [Price: Roubles 32.50, paper bound.] [In Russian.]

The reviewed book of the *Fauna SSSR* series is the fourth issue dealing with the Lepidoptera. Its contents: Title page, with editorial notes on the reverse (2 pp.); Preface (2 pp.); Systematical Species List (5 pp.); Introduction (101 pp., 54 figs.), with six chapters (Imaginal Morphology, Morphology of Immature Instars, Biology and Ecological Relations, Classification and Phylogeny, Geographical Range, Economic Importance); Bibliography, compiled corresponding to the chapters of the Introduction (8 pp.; the bibliography to the chapter on the classification is the same as that of Special Part); Special Part (391 pp., 280 figs.); Alphabetical Index (7 pp.); Table of Contents (1 p.). All chapters of Introduction are very circumstantial and include many new data.

In the Special Part the family Psychidæ is additionally characterized, and two keys to subfamilies, one based on adults, the other on larvæ, are given. The family is divided into two subfamilies, Psycheoidinæ and Psychinæ. The keys to the genera are given separately for male moths and for larvæ. 25 genera of Psycheoidinæ (four of them are new) and 17 of Psychinæ (one of them new) are described and illustrated. Detailed redescriptions of 139 species and descriptions of 32 new species. All descriptions are accompanied by data on the range and ecology of the species. Not only the species known to be found in the USSR are reviewed, but in many cases also those which may have been expected to be found there, since they are known from neighboring countries. The keys to the species, based on male moths, are very instructive. The good enlarged figures drawn by E. BLAGOVESTSHENSKAYA represent males of 21 species; the females are figured more schematically, sometimes only as halves, in general of 17 species. Figures of male genitalia of 122 species; six figures of female genitalia; larval cases of 14 species. 130 figures of various morphological structures (wing venation, legs larval chætotaxy, etc.); three phylogenetic schemata; 32 maps of geographic distribution of the family, some genera and species.

As the author writes himself, his work is based chiefly on the materials in the collection of the Zoological Institute in Leningrad, and on published ecological data. The author himself studied in nature only some of the northern Russian Psychidæ species. This is the reason why the paper gives the impression of being a purely "academic" research based on materials not especially collected for it. This also explains the very limited data on females and larval cases contained in the book. The bibliography is given quite completely; only the Psychidæ monograph by BRUAND (1853) was inaccessible to the author. Also the most recent papers by SIEDER (1954, 1955) on Taleporiinæ were not revised.

It is regrettable that neither the exact data on the specimens studied nor the number of genitalia slides are listed in the book. Some nomenclature inaccuracies should be mentioned. The subfamily name Psycheoidinæ contradicts the *Copenhagen Decisions on Zoological Nomenclature* of 1953, since this name is not based on a really existing genus. It should probably be replaced by the name Taleporiinæ proposed by TUTT (1900) as a family name among some others for the group in question, and subsequently preferred and used by REBEL, originally (1901) for a family, and later (1906) for a subfamily. Very doubtful is the replacement of the generic name *Canephora* Hb. by *Lepidopsyche* Newman, 1850. The author supposed the HÜBNER name was published only in the *Tentamen* (1806) and overlooked its validation by HÜBNER in his *Systematisch-alphabetisches Verzeichniss* (1822). The author neglected also the importance of a type designation for the new species he described; perhaps the type specimens are marked as such in the collection but this is not seen from the book. All geographical and other infraspecific forms are synonymized with nominate specific forms; this stands in complete accordance with the author's views on geographic variation.

The few above inaccuracies cannot diminish the scientific value of the Psychidæ book by KOZHANTSHIKOV, and his work must be recognized as promoting the study of the family and therefore very important for specialists working upon this group.

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A SILKMOTH REARER'S HANDBOOK. By W. J. B. Crotch. 165 pp., 26 pls. (2 colored), 27 figs. 1956. Publisher — The Amateur Entomologists' Society, 1 West Ham Lane, London E.15, England. (Price, paper cover, 18 shillings, postpaid.)

Mr. CROTCH has completely revised the earlier edition of the *Handbook* by BEOWULF A. COOPER. This is a wonderful compendium of tricks of the breeders' trade, certain to have many new and useful suggestions for any lepidopterist who rears the Giant Silkworms — Saturniidæ — of any part of the world. There are notes on foodplants, descriptions of larvæ, cocoons, even eggs, notes on clock-times of pairing of many species, the formula for SMITH'S ELIXIR (a nutrient solution to be sprayed on leaves in a poor state to nourish caterpillars), the method of distinguishing the sex of pupæ, and much more. Most of the species in the world are at least mentioned in the text, with the genera in alphabetical order. North American species are particularly fully discussed. The plates are full of excellent photographs, and the figures are clear. There are points which really should have been included or improved: the nomenclature is unnecessarily antiquated, the hand-pairing method is not mentioned, MICHENER'S excellent revision of the major groups of Saturniidæ (see *Lepid. News* 6: 109-111; 1952) is old enough to have been included. But this is not a pretentious treatise; it is a handbook for all of us, whatever the focus of our interest in Silkmoth rearing.

C. L. REMINGTON

The long awaited monograph of the genus *Anæa* by the late WILLIAM P. COMSTOCK has been announced as nearing publication by the American Museum of Natural History. This large and complicated genus of magnificent butterflies of the American tropics was the principal focus of COMSTOCK'S exceptionally fine taxonomic talents during his later years. His part was completed some time ago, but funds were not available to publish the monograph in the elegant style needed for suitable treatment of a group in which color characters are so important. The Museum has now announced that, if there is sufficient pre-publication response, it is now ready to proceed with publication. The book will contain 30 exquisite color plates, 19 pages of black-and-white drawings, and 292 pages; the page size will be 9¾ by 13 inches. In addition to the high scientific quality which COMSTOCK'S authorship brings, the very beautiful color plates and the rich format will make this a volume the equal of which appears only once in decades. The announced price is surprisingly low: before publication it will be $20.00; after publication it will be $25.00. The book will be published in only a limited quantity and may go out of print soon. Lepidopterists who have not yet received the prospectus, with specimen plate in color, should write to: *The American Museum of Natural History, Central Park West at 79th Street, New York 24, N. Y., U. S. A.* Payment may be made directly to the museum or to: *W. S. Cowell Ltd., Butter Market, Ipswich, Suffolk, England.*

C. L. REMINGTON

RECENT LITERATURE ON LEPIDOPTERA

(Under the supervision of PETER F. BELLINGER)

Under this heading are included abstracts of papers and books of interest to lepidopterists. The world's literature is searched systematically, and it is intended that every work on Lepidoptera published after 1946 will be noticed here; omissions of papers more than 3 or 4 years old should be called to Dr. BELLINGER'S attention. New genera and higher categories are shown in CAPITALS, with types in parentheses; new species and subspecies are noted, with type localities if given in print. Larval foodplants are usually listed. Critical comments by abstractors may be made. Papers of only local interest and papers from *The Lepidopterists' News* are listed without abstract. Readers, particularly outside of North America, interested in assisting with this very large task, are invited to write Dr. BELLINGER (Osborn Zoological Lab., Yale University, New Haven 11, Conn., U. S. A.) Abstractors' initials are as follows: [P.B.] — P. F. BELLINGER; [I.C.] — I. F. B. COMMON; [W.C.] — W. C. COOK; [A.D.] — A. DIAKONOFF; [W.H.] — W. HACKMAN; [J.M.] — J. MOUCHA; [E.M.] — E. G. MUNROE; [N.O.] — N. S. OBRAZTSOV; [C.R.] — C. L. REMINGTON; [J.T.] — J. W. TILDEN; [P.V.] — P. E. L. VIETTE.

B. SYSTEMATICS AND NOMENCLATURE

Adamczewski, Stanislaw, "On the systematics and origin of the generic group *Oxyptilus* Zeller." *Bull. Brit. Mus. (Nat. Hist.)—Ent.*, vol.1: pp.301-387, 12 pls. 30 Nov. 1950. Describes as new *PROCAPPERIA* (type *Oxyptilus maculatus*), *P. croatica* (Zengg, S. Croatia); *Capperia washbourni* (Shar Deresy, Syria), *C. tamsi* (Alma Dagh, Asia Minor), *C. hellenica* (Tembi, Thessaly, Greece), *C. zelleri* (Catania, Sicily), *C. polonica* (Aritzo, Sardinia), *C. maratonica* (Kato Suli, Greece), *C. fletcheri* (Kirjat-Anavim, Jerusalem, Palestine); also one "form" (foodplant race) of *C. fusca*. Systematic revision of the genera *Sphenarches, Geina, Procapperia,* and *Capperia;* generic definitions and lists of spp. of *Oxyptilus* and *Crombrugghia;* notes on the *Trichoptilus* group (*Megalorrhipida, Trichoptilus, Buckleria, Stangeia,* and probably other undescribed genera). Additional sections deal with the previous treatment of the group, morphology, ecology, distribution, and phylogeny (which is interpreted in terms of the continental drift theory). [P.B.]

d'Almeida, Romualdo Ferreira, "Uma nova espécie de *Actinote* do sul do Brasil (Lepidoptera Heliconiidæ, Acræinæ)" [in Portuguese]. *Arq. Mus. Nac. Rio de Janeiro,* vol.42: pp.3-5, 2 figs. 1955. Describes as new *A. zikani* (Salesopolis, S. Paulo); redescribes ♂ of *A. morio*. [P.B.]

Aubert, J. F., "Revision préliminaire du genre *Entephria* Hb. [in French]. *Rev. franç. Lépid.*, vol.15: pp.62-69. Dec. 1955. Preliminary revision of the geometrid genus *Entephria* and description of a new genus *CALOSTIGIODES* (type *uncinata* Püngeler). [P.V.]

Berger, Lucien A., "Catalogues raisonnés de la faune entomologique du Congo Belge. Lépidoptères—Rhopalocères. I.—Fam. Papilionidæ" [in French]. *Ann. Mus. Congo Belge C. Zool. Série III (II)*, vol.8: pp.1-104, 96 figs. 1950. Describes as new *Papilio nobilis leroyi* (Rutshuru, Kivu), *P. sosia pulchra* (Stanleyville); *Graphium ucalegon schoutedeni* (Bambesa, Uele), *G. ucalegonides rileyi* (Begoro, Gold Coast), *G. odin eyeni* (Lemfu, Bas Congo), *G. olbrechtsi* (Mwene-Ditu, Sankuru), *G. adamastor zongo* (Zongo-Mokoanghay, Congo-Ubangi), *G. a. dimbroko* (Sierra Leone); also a number of "forms" and aberrations. The arrangement is based on study of the genitalia, but these are not described. All spp. are figured and all entities briefly redescribed. Distribution, collection records, and references to studies of biology or genetics are given for each form. 49 spp. (of 69 in continental Africa) are included. [P.B.]

Berger, L. A., "Un cas d'homonymie" [in French]. *Lambillionea,* vol.55: pp.86-87. 25 Dec. 1955. The genus *Phalanta* Ghesquière (1942) (Pyralidæ) is preoccupied by *Phalanta* Horsfield (1829) (Nymphalidæ) and is also a synonym of *Phostria*. A new genus *GHESQUIERELLA* (type *dioramica* Ghesquiere) (Pyraustidæ) is proposed. [P.V.]

Berio, E., "*Georyx muscosa* Gey. e le specie affini (Lepid. Noct.)" [in Italian]. *Rev. Zool. Bot. Afr.,* vol.51: pp.212-222, 10 figs. 16 July 1955. Describes as new *G.*

leroyi, G. percurvata (Belgian Congo); *G. fletcheri* (Natal); *G. basilewskyi, G. bergeri* (Kivu). *G. albifrons* distinct from *G. muscosa.* [P.V.]

Beuret, Henri, "Support for the proposed use of the Plenary Powers for validating the trivial name *adippe,* as published in the combination *Papilio adippe* in the Vienna Catalogue of 1775 (Class Insecta, Order Lepidoptera)." *Bull. Zool. Nomencl.,* vol.9: p.135. 30 Dec. 1952.

Blair, K. G., "*Sedina buettneri* Hering at Freshwater, I. O. W." *Ent. Gaz.,* vol.2: pp.249-252, 1 pl. Oct. 1951. Describes biology and discusses systematic position of a local British species; colored figures of adult.[P.B.]

Bourgogne, Jean, "Révision des espèces africaines du genre *Eumeta* Walker (*Clania* auct.) (Lepidoptera: Psychidæ)" [in French]. *Trans. Roy. Ent. Soc. London,* vol.107: pp.125-138, 1 pl., 11 figs. 6 Dec. 1955. Describes as new *E. hardenbergi* (Delagoa Bay, Mozambique); *E. rougeoti* (Port Gentil, Gabon); *E. strandi* (Ogooé, Lambaréné). Redescribes *E. cervina* (syn. *moddermanni*); removes other spp. from genus. [P.B.]

Boursin, Ch., "Description de nouvelles espèces et formes du bassin méditerranéen (Lep. Phal.) (diagnoses préliminaires)" [in French]. *Bull. Mens. Soc. Linn. Lyon,* vol.24: pp.252-255. Dec. 1955. Describes as new *Lithophane mouterdi* (Beyrouth, Syria); *Derthisa didymogramma* (S. Turkey); also new "forms" of *Derthisa* spp. Sinks *Antitype annibalella* to *Eumichtis lichenea; A. amilcarella* to *Euxoa canariensis mauretanica; Metachrostis incomposita to Œderemia precisa.* [P.V.]

Boursin, Ch., "Qu'est-ce-que l'*'Agrotis' nictymera* B.? (Lep. Phal.)" [in French]. *Bull. Mens. Soc. Linn. Lyon,* vol.25: pp.3-6. Jan. 1956. Boisduval's species is identified as *Standfussiana osmana Wagner,* 1929. The nominal ssp. is from the Alps; *osmana* is the name of the ssp. from the Middle East mountains. Describes as new *S. dalmata occidentalis* (Alps [holotype] and Pyrenees). [P.V.]

Box, Harold E., "New crambine genera allied to *Diatræa* Guilding (Lepidoptera: Pyralidæ).—III" *Proc. Roy. Ent. Soc. London (B),* vol.24: pp.197-200, 1 fig. 30 Dec. 1955. Describes as new *ZEADIATRÆA* (type *lineolata*); notes on the 4 spp. included. [P.B.]

Bradley, J. D., "A comparative study of four European species, including one new species from Britain, belonging to the genus *Mompha* Huebner (Lepidoptera: Lavernidæ)." *Ent. Gaz.,* vol.2: pp.173-182, 1 pl., 12 figs. July 1951. Describes as new *M. subdivisella* (Merton, Norfolk). Redescribes *M. subbistrigella, M. nodicolella,* and *M. divisella,* all feeding on *Epilobium* spp. [P.B.]

Bradley, J. D., "Microlepidoptera collected in the Burren, Co. Clare, Ireland, in 1951, including two species new to the British list." *Ent. Gaz.,* vol.3: pp.185-191, 1 pl., 5 figs. Oct. 1952. Sinks *Coleophora gotlandica* to *C. teidensis;* redescribes latter and *Elachista exiguella.* Annotated list of 80 spp. [P.B.]

Bradley, J. D., "A new family assignment for *Pancallia woodiella* Curtis, 1830, and some notes on this species (Lepidoptera)." *Ent. Gaz.,* vol.4: pp.172-174, 2 figs. July 1953. Transfers species, known from 3 specimens, to *Euclemensia* (Heliodinidæ); suggests that it feeds on scale insects, like other *Euclemensia,* and was imported into Britain from North America. [P.B.]

Bradley, J. D., "Microlepidoptera collected in the Burren, Co. Clare, Ireland, in 1952, including a plume moth new to the British list." *Ent. Gaz.,* vol.4: pp.135-140, 1 pl. April 1953. Redescribes *Alucita icterodactyla.* Annotated list of some 125 spp. [P.B.]

Bradley, J. D., "A note on the identity of *Coleophora tripoliella* Hodgkinson, 1875, and *C. virgaureæ Stainton,* 1857 (Lep. Coleophoridæ)." *Ent. Gaz.,* vol.6: pp.150-151, 1 pl., 3 figs. 13 July 1955. Selects types; sinks *tripoliella* to *asteris;* figures wings, genitalia, and larval cases of both species. [P.B]

Brown, F. Martin, "Comment on the action proposed in relation to the trivial names involved in the *niobe/cydippe/adippe* complex (Class Insecta, Order Lepidoptera)." *Bull. Zool. Nomencl.,* vol.9: p.134. 30 Dec. 1952. Opposed to conservation of *adippe;* would prefer to have *phryxa* or *syrinx* used for the High Brown Fritillary. [P.B.]

Bryk, Felix, "Neue *achine*-Formen (Lep.: Satyridæ)" [in German]. *Ent. Tidskr.,* vol.72: pp.181-183. 1951. Describes as new *Pararge achine ölleri* (Myrskylä, Finland); *P. a. amata* (Amata, Lettland). Notes on other subspecies. [P.B.]

Bryk, Felix, "Specimina typorum insectorum a Carolo Linnæo descriptorum in Museo Degeeriano asservata" [in German]. *Ent. Tidskr.,* vol.73: pp.43-52. 10 May 1952. Identifies types of *Amorpha populi, Eudia pavonia, Trigonophora meticulosa* in DeGeer's collection; notes on these and some other specimens mentioned by Linnæus. Points out that still other specimens must be "iconotypes," since DeGeer's figures, on which some Linnæan spp. are based, were presumably made from specimens in his collection [P.B.]

Bryk, Felix, "Support for the proposed use of the Plenary Powers to validate the trivial name *adippe* as published in the combination *Papilio adippe* by Denis and Schiffermüller in 1775 (Class Insecta, Order Lepidoptera)" [in German]. *Bull. Zool. Nomencl.*, vol.9: p.132. 30 Dec. 1952.

Bryk, Felix, "Rectificationes nomenclatoricæ (Lep., Col.)" [in German]. *Ent. Tidskr.*, vol.74: pp.201-202. 25 Jan. 1954. Sinks *Euplœa treitschkei dampierensis* to *E. t. gustavi-felleri* [P.B.]

Clark, Austin H., "On the proposed use of the Plenary Powers to suppress the trivial name *ajax* Linnæus, 1758 (as published in the combination *Papilio ajax*) (Class Insecta, Order Lepidoptera)." *Bull. Zool. Nomencl.*, vol.6: p.167. 22 May 1952. Favors suppression.

Clarke, C. A., & J. P. Knudsen, "A hybrid swallowtail. An account of the 'cross' *Papilio asterias* ♀ (North American Black Swallowtail) × *Papilio machaon* ♂ (the Swallowtail, of European-Malta stock) and a note on the '*machaon* complex' of the North American continent." *Ent. Rec.*, vol.65: pp.76-80, 7 pls., 1 fig. 15 March 1953. Hybrid adults resemble *asterias;* larvæ, *machaon.* Species appear to be distinct, since hybrids are infertile. [P.B.]

Clarke, C.A., & P.M. Sheppard, "Further observations on hybrid swallowtails." *Ent. Rec.*, vol.65, suppl.: 12 pp., 7 pls., 1 map. Sept. 1953. Reports on various crosses involving *P. machaon, P. polyxenes, P. brevicauda, P. zelicaon.* Some backcrosses, but no sibling matings, were successful. *P. zelicaon* is the most isolated; all are good species or at least extreme subspecies (of *machaon*). [P.B.]

Clarke, C. A., & P. M. Sheppard, "The breeding in captivity of the hybrid swallowtail *Papilio machaon gorganus* Fruhstorfer ♀ × *Papilio hospiton* Géné ♂." *Entomologist*, vol.88: pp.266-270, 4 pls. Dec. 1955. Describes hybrids. *P. hospiton* is considered to approach *P. m. saharæ;* its genetic isolation from European *P. machaon* is incomplete. [P.B.]

Clarke, J. F. Gates, "Neotropical moths of the genus *Orthocomotis* Dognin (Lepidoptera: Tortricidæ)." *Trans. Roy. Ent. Soc. London*, vol.107: pp.139-156, 6 pls. 6 Dec. 1955. Describes as new *O. maroda* (Nova Teutonia, Brazil); *O. jordani* (New Bremen, Brazil); *O. nitida* (Cayuga, Guatemala); *O. ochracea* (Juan Vinas, Costa Rica); *O. prochaldera* (Loja, Ecuador); *O. euchaldera* (San Antonio, Colombia); *O. pseudolivata* (New Bremen, Brazil); *O. exolivata* (Nova Teutonia, Brazil); *O. subolivata* (Tuis, Costa Rica); *O. aglaia* (Itatiaya, Est. do Rio, Brazil); *O. leucothorax* (New Bremen, Brazil); *O. herbacea* (San Pedro de Montes de Oca, Costa Rica); *O. twila* (New Bremen, Brazil); *O. ochrosaphes* (Santa Catharina, Brazil); *O. melania* (St. Ann Parish, Jamaica); *O. argodonta* (Santa Catharina, Brazil); *O. cristata* (Cachi, Costa Rica). Transfers *melanochlora, chloantha, chaldera, smaragditis, magicana, muscosana, smaragdophæa, scardiana* from *Eulia; herbaria* from *Sociphora; boscantina* from *Tortrix; citroleuca* from *Cnephasia;* notes on these spp. and on *O. olivata.* Key to spp. [P.B.]

C[lassey], E. W., F. T. Vallins, A. J. Dewick & A. H. H. Harbottle, "*Colias australis* Verity." *Ent. Gaz.*, vol.1: pp.113-125, 2 pls. July 1950. A symposium on this species: distinction from *C. hyale,* description of early stages, rearing notes. [P.B.]

Clench, Harry K., "Notes on *Parabasis pratti*, a 'mislaid' notodontid from New Guinea." *Lepid. News*, vol.10: pp.15-17, 4 figs. 10 Aug. 1956.

Cockayne, E. A., "*Aspilates gilvaria* Fabricius ssp. *burrenensis* ssp. nov." *Ent. Gaz.*, vol.2: pp.100-101, 12 figs. April 1951. From The Burren, Co. Clare, Ireland. Also names an aberration of *Eupithecia goossensiata.* [P.B.]

Cockayne, E. A., "Notes on the five rare species of British Lepidoptera illustrated in colour in plate A." *Ent. Gaz.*, vol.5: pp.189-192, 1 pl. 3 Dec. 1954. *Luperina gueneei, Ægeria flaviventris, Sarrothripus degenerana, Eupithecia millefoliata, Cosymbia pupillaria;* distinctive characters, history as British species, food plants. [P.B.]

Cockayne, E. A., "The Irish subspecies of *Calamia virens* L., (Lep.: Caradrinidæ)." *Ent. Gaz.*, vol.5: pp.155-156. 23 Aug. 1954. Describes as new *C. v. occidentalis* (Ballyvaughan, Co. Clare); comparative notes on some European aberrations. [P.B.]

Collenette, C. L., "A key to the African genera of Lymantriidæ (Lepidoptera)." *Trans. Roy. Ent. Soc. London*, vol.107: pp.187-197. 6 Dec. 1955. Describes as new USIMBARA (type *Aroa lata*). Sinks *Aclonophlebia* to *Rhypopteryx, Bicelluphora* to *Dasychira, Liparodonta* to *Euproctidion, Lymantica* to *Lymantria; Pseudarctia* to *Spilosoma* (Arctiidæ); transfers *Pachycispia* to Notodontidæ. Key to 91 genera, based on external characters. [P.B.]

Cowan, C. F., "The status of the genus *Saletara* Distant (Lepidoptera, Rhopalocera) and its species." *Bull. Raffles Mus.*, no.25: pp.171-184, 1 map. "Dec. 1954" [1955]. Genus distinct from *Appias;* differences noted. Includes the single species *S. liberia,* with numerous races in the Indomalayan region. Chronological list of names applied, with critical comments. Describes as new *S. l. natunensis* (Great Natuna Is.); *S. l. dohertyi* (Sambawa). List of recognized races and their distributions, and of "forms." [P.B.]

Comstock, John A., & Lloyd M. Martin, "A new *Papilio* from California." *Bull. So. Calif. Acad. Sci.,* vol.54: pp.142-150, 5 figs. 1955. Describes as new *P. indra fordi* (Granite Mts., San Bernardino Co., Calif.); describes larva and pupa; foodplants *Cymopterus panamintensis* (preferred), *Velæa argula.* [P.B.]

Diakonoff, A., "A revision of the family Ceracidæ (Lepidoptera Tortricoidea)." *Bull. Brit. Mus. (Nat. Hist.)*—Ent., vol.1: pp.217-219, 34 figs. 17 June 1950. Describes as new *Pentacitrotus quercivorus* (Deobar, NE Himalayas; on *Quercus semicarpifolia*); *Eurydoxa rhodopa* (Tse-kou, China), *E. tamsi* (Phedong, Sikkim, India); *Cerace tetraonis archimedes* (3 localities in India & Burma), *C. anthera* (Siao-Lou, China), *C. xanthocosma* (Japan, various localities), *C. guttana obscura* (Bengal), *C. cyanopyga* (Maymo, Burma), *C. xanthothrix* (Golaghat, Naga Hills, Assam), *C. stipitana birmensis* (Ruby Mines District, Burma), *C. s. clara* (India), *C. s. formosana* (Formosa), *C. s. exsul* (Chusan Is., China), *C. s. sinensis* (Chang Yang, Ichang, China); *BATHYPLUTA* (type *Cerace triphænella*), *B. t. sparna* (Mt. Tengger, E. Java), *B. metœca* (Pura Is., Lesser Sunda Islands); also two "varieties." Reinstates family. Keys to families of Tortricoidea and to genera and species of Ceracidæ. All species described. [P.B.]

Diakonoff, A., "Case bearing Lepidoptera III." *Idea,* vol.8: pp.83-91, 15 figs. 31 Jan. 1951. Gives keys to adults and larval cases of Javanese spp. of *Pseudodoxia* (Œcophoridæ); describes as new *P. pulla* and *P. modica* and describes the genitalia of *P. siriopa* and *P. xanthocephala.* Figures genitalia and larval cases. [A.D.]

Diakonoff, A., "Proposed addition to the *Official List of Generic Names in Zoology* of the generic name *Enarmonia* Hübner, [1825] in order to prevent unnecessary confusion with *Ernarmonia,* being the misspelled equivalent of this generic name (Class Insecta, Order Lepidoptera, Suborder Heterocera)." *Bull. Zool. Nomencl.,* vol.6: pp.155-156. 15 April 1952.

Diakonoff, A., "Support for Dr. John G. Franclemont's proposal relating to the generic name *Phalæna* Linnaeus, 1758, and matters connected therewith (Class Insecta, Order Lepidoptera)." *Bull. Zool. Nomencl.,* vol.9: p.151. 30 Dec. 1952. Refers especially to *Tortrix* and *Tinea.* [P.B.]

Diakonoff, A., "Microlepidoptera of New Guinea. Results of the third Archbold Expedition (American-Netherlands Indian Expedition 1938-1939). Part II." *Verhandel. Kon. Nederl. Akad. Wetensch., Natuurk., Sect.2,* vol.49, no.3: pp.1-166, 163 figs. 1953. Describes following as new. (Tortricidæ, Tortricinæ): *Choanograptis diagrapha* (Moss Forest Camp), *C. paragrapha* (Sigi Camp), *C. argyrocyma* (Moss Forest Camp), *C. tetraulax* (Sigi Camp), *C. hamuligera* (Lake Habbema), *C. diaphora* (Mist Camp); *Epagogne conspersa* (Mist Camp); *Paradichelia clarinota* (Moss Forest Camp), *P. fulvitacta* (Top Camp), *P. ocellata* (Moss Forest Camp); *Neocalyptis monotoma* (Mist Camp); *Harmologa arenicolor* (foot of Wilhelmina Top); *Diadelomorpha clavigera* (Moss Forest Camp); *Syndemis plumosa* (Moss Forest Camp); *Æolostoma melanostœcha* (Scree Valley Camp), *Æ. orophila* (Letter Box Camp); *HICETERIA,* and type *H. heptatoma* (L. Habbema), *H. heterogona* (Moss Forest Camp), *H. stannosa* (Mist Camp); *CARPHOMIGMA,* and type *C. leontodes* (Top Camp); *ARIZELANA,* and type *A. margaritobola* (Rattan Camp), *A. pyroplegma* (Iebèlè Camp), *A. bibatrix* (Iebèlè Camp); *APHTHONOCOSMA,* and type *A. plutarcha* (Araucaria Camp); *Nikolaia melanopsygma* (Moss Forest Camp); *ARCTEPHORA,* and type *A. iubata* (Sigi Camp); *Capnoptycha thelea* (Mist Camp); *Rhomboceros barbata* (Mist Camp), *R. pulverulenta* (Mist Camp), *R. iridescens* (Mist Camp), *R. ethica* (Moss Forest Camp); *APLASTOCEROS,* and type *A. peneploca* (Moss Forest Camp), *A. dentifera* (Moss Forest Camp), *A. plumbata* (Moss Forest Camp), *A. carphalea* (Moss Forest Camp), *A euetrias* (Iebèlè Camp); *CLEPTACACA,* and type *C. tryphera* (Sigi Camp); *TREMOPHORA,* and type *T. carycina* (Moss Forest Camp), *T. scintillans* (Moss Forest Camp), *T. alopex* (Mist Camp), *T. guttulosa* (Moss Forest Camp), *T. coniortus* (Moss Forest Camp); *MESOCALYPTIS,* and type *M. morosa* (Moss Forest Camp), *M. zonata* (Sigi Camp); *Tæniarchis acrotoma* (Araucaria Camp), *T. poliostoma* (Moss Forest Camp); *Dicellitis acrographa* (Araucaria Camp); *D. chrysonetha* (Rattan Camp); *Pternozyga melanoterma*

(Iebèlè Camp); *Pandurista encarsiotoma* (Rattan Camp); *Spatalistis perusta* (Moss Forest Camp), *S. argyrosperma* (Moss Forest Camp), *S. violacea* (Moss Forest Camp); *Eremas polystalagma* (Top Camp); *Polyortha ornithopora* (Top Camp). (Eucosminæ): *Bactra stramenticia* (Letter Box Camp); *Lobesia paradisea* (Moss Forest Camp), *L. tritoma* (Rattan Camp); *Endothenia simplissima* (Iebèlè Camp); *METASCHISTIS, M. sappiroflua* (Sigi Camp), *M. hemicyclica* (Top Camp), *M. hemicapnodes* (Scree Valley Camp), *M. hæmatina* (Moss Forest Camp), *M. purpurescens* (Moss Forest Camp), *M. gypsopa* (Moss Forest Camp), *M. cretata* (Sigi Camp); *Anathamna chionopyra* (Iebèlè Camp); *Argyroploce hemeronyx* (Iebèlè Camp), *A. margaritopa* (Iebèlè Camp), *A. rivulosa* (Araucaria Camp), *A. leucocteis* (Moss Forest Camp); *Peridædala crastidochroa* (Iebèlè Camp), *P. prasina* (Lake Habbema), *P. archæa* (Letter Box Camp); *Hermenias niphobola* (Sigi Camp), *H. terminata* (Letter Box Camp), *H. saxicolor, H. scoliomelas* (Lake Habbema), *H. merodelta* (Top Camp), *H. angulata* (Moss Forest Camp), *H. psimythographa* (Moss Forest Camp), *H. dirupta* (Lake Habbema), *H. conglomerata* (Moss Forest Camp), *H. platysphena* (Lake Habbema), *H. dendrosema* (Lake Habbema), *H. serrula* (Lake Habbema), *H. pollostes* (Sigi Camp), *H. gracilis* (Lake Habbema), *H. eugena* (Top Camp), *H. textrix* (Lake Habbema), *H. corticina* (Lake Habbema), *H. tristis* (Lake Habbema), *H. xylogena* (Lake Habbema); *Bathrotoma angelica* (Mist Camp); *ALLOHERMENIAS*, and type *A. tenuitexta* (Moss Forest Camp), *A. subpetræa* (Scree Valley Camp); *Spilonota selene* (Moss Forest Camp), *S. pyrochlora* (Scree Valley Camp), *S. lobata* (Rattan Camp); *Acroclita allodapa* (Moss Forest Camp); *Eucosma inconspicua* (Rattan Camp); *Pseudogalleria toxotis* (Araucaria Camp), *P. amethystina* (Araucaria Camp); *CROCOSTOLA*, and type *C. hyperphyes* (Mist Camp); *Enarmonia alternans* (Sigi Camp); *Sereda myodes* (Sigi Camp). Redescribes the genera *Diadelomorpha, Nikolaia, Rhomboceros, Tæniarchis, Beryllophantis, Peridædala, Hermenias, Pseudogalleria.* Gives keys to genera and species of the Papuan region [A.D.]

Dufrane, A., "Corrections" [in French]. *Bull. & Ann. Soc. Ent. Belg.*, vol.88: p.24. 29 Feb. 1952. Proposes *Metarctia taymansi diffusa* n.n. for *M. t. kamitugensis* Dufrane, 1945, p.133, *nec* p. 130; other minor corrections. [P.B.]

Dujardin, F., "La genèse quaternaire et monographie raisonnée des races de *Lysandra hispana* H.S." [in French]. *Lambillionea*, vol.49: pp.111-116. 25 Oct. 1949.

Eisner, C., "Parnassiana nova. I. Kritische Revision der Gattung *Parnassius* (Fortsetzung 1)" [in German]. *Zool. Meded.*, Leiden, vol.33: pp.41-48. 13 Dec. 1954. The "Parnassiana" series, edited before the war together with F. Bryk, is now being continued by the author alone. Gives a list of new acquisitions of his well-known collection, now in the Rijsmuseum van Natuurlijke Historie of Leiden. [A.D.]

Eisner, C., "Parnassiana nova. VI. Kritische Revision der Gattung *Parnassius* (Fortsetzung 3)" [in German]. *Zool. Meded., Leiden*, vol.33: pp.181-207, 1 pl. 11 July 1955. Describes several new "forms" and subspecies: *P. epaphus höniana* (Altyn-Tag, Tibet); *P. e. eutstidamensis* (Wildyak zone, Tibet); *P. e. shansiensis* (Mien-shan, Shansi). [A.D.]

Eisner, C., "Parnassiana nova. VII. Kritische Revision der Gattung *Parnassius* (Fortsetzung 4)" [in German]. *Zool. Meded.*, Leiden, vol.34: pp.1-16. 21 Sept. 1955. Gives a list of subspecies of *P. apollo* [A.D.]

Eisner, C., "Parnassiana nova. VIII. Kritische Revision der Gattung *Parnassius* (Fortsetzung 5)" [in German]. *Zool. Meded.*, Leiden, vol.34: pp.155-172, 1 pl. 11 Jan. 1956. Gives a list of subspecies and "forms" of *P. apollo* from France and Spain. [A.D.]

Evans, W. H., "Support for the Dos Passos/Bell proposal relating to the name *Megathymus aryxna* Dyar, 1905." *Bull. Zool. Nomencl.*, vol.91: p.294. 30 Dec. 1955.

Field, William D., "On the proposed suppression of the trivial name *ajax* Linnæus, 1758 (as published in the combination *Papilio ajax*) (Class Insecta, Order Lepidoptera)." *Bull. Zool. Nomencl.*, vol.6: pp.105-106. 28 Sept. 1951.

Fletcher, D. S., "Notes on some subspecies of Geometridæ." *Ent. Gaz.*, vol.4: pp.225-235, 1 pl., 15 figs. July 1953. Color plate of 7 spp. recognized only since 1900: *Ortholitha mucronata, Lampropteryx otregiata, Dysstroma concinnata, Thera variata, Anaitis efformata, Eulype subhastata, Oporinia christyi.* Gives synonymy and points of difference from relatives; figures genitalia of 4 species pairs. [P.B.]

Forbes, Wm. T. M., "Support for the action proposed in regard to the names involved in the *niobe/adippe* complex (Class Insecta, Order Lepidoptera)." *Bull. Zool. Nomencl.*, vol.9: p.133. 30 Dec. 1952.

Forbes, William T. M., "On the limiting of subspecies." *Lepid. News*, vol.10: pp.35-36. 10 Aug. 1956.

Ford, Leonard T., "A new stigmellid." *Ent. Gaz.,* vol.1: pp.39-40, 1 fig. Jan. 1950. Describes as new *Stigmella marionella* (Stanmore, Middlesex, England). [P.B.]

Fox, Richard M., "*Œneis semidea* Say (Lepidoptera: Satyridæ) of Pike's Peak, Colorado and Mt. Washington, New Hampshire." *Journ. Colorado-Wyoming Acad. Sci.,* vol.4, no.6: pp.60-61; Dec. 1954. *O. semidea* of Mt. Washington found to be genitalically and in color distinct from *O. lucilla* of Colorado; both considered races of *O. melissa.* Abstract only. [C.R.]

Franclemont, John G., "Comment on Dr. Jiří Paclt's proposal relating to the generic name *Bombyx* Fabricius, 1775 (Class Insecta, Order Lepidoptera)." *Bull. Zool. Nomencl.,* vol.9: p.154. 30 Dec. 1952. *Sericaria* dates from Latreille, 1829, with type *dispar* Fabr. [P.B.]

Franclemont, John G., "Comment on Dr. Jiří Paclt's proposal relating to the generic name *Diloba* Boisduval, 1840 (Class Insecta, Order Lepidoptera)." *Bull. Zool. Nomencl.,* vol.9: p.145. 30 Dec. 1952. *Diloba* an objective synonym of *Heteromorpha* Hbn. *Episema* and *Derthisa* have also been used for *cæruleocephala,* which Palct would make the type of *Diloba;* this species is actually a noctuid. [P.B.]

Franclemont, John G., "Comment on Dr. Jiří Paclt's proposal relating to the generic name *Pyralis* Fabricius, 1775 (Class Insecta, Order Lepidoptera)." *Bull. Zool. Nomencl.,* vol.9: p.155. 30 Dec. 1952. *Pyralis* Fabr. does not include *farinalis,* which Palct would make the type species. [P.B.]

Franclemont, John G., "Comment on Dr. Jiří Paclt's proposal relating to the generic name *Sphinx* Linnæus, 1758 (Class Insecta, Order Lepidoptera)." *Bull. Zool. Nomencl.,* vol.9: p.144. 30 Dec. 1952. Selection of type as *ligustri* made first by Curtis, 1828. [P.B.]

Franclemont, John G., "On the proposed use of the Plenary Powers to suppress the generic name *Phalæna* Linnæus, 1758 (Class Insecta, Order Lepidoptera) and to validate, as of subgeneric status, certain generic terms then used by Linnæus for subdivisions of the genus: reply to certain criticisms made by Dr. Jiří Paclt." *Bull. Zool. Nomencl.,* vol.9: pp.149-150. 30 Dec. 1952. Disagrees with Paclt (same date), especially with regard to *Alucita,* which would have a different type if dated from 1775, and the types of *Phalæna* and *Noctua,* which he believes to be the same. [P.B.]

Franclemont, John G., "Proposed use of the Plenary Powers to validate as subgeneric names as from Linnæus, 1758, certain terms published for groups of species within the genus *Phalæna* Linnæus, 1758 (Class Insecta, Order Lepidoptera) (application submitted in response to the invitation given in *Opinion* 124)." *Bull. Zool. Nomencl.,* vol.6: pp.304-312. 29 Aug. 1952. Request for suppression of *Phalæna* and validation of the following names (types in parentheses): *Bombyx* (*mori*), *Noctua* (*pronuba*), *Geometra* (*papilionaria*), *Tortrix* (*viridana*), *Pyralis* (*farinalis*), *Tinea* (*pellionella*), *Alucita* (*hexadactyla*). [P.B.]

Freeman, H. A., "A new species of *Hesperia* from California (Hesperiidæ)." *Lepid. News,* vol.9: pp.196-198, 5 figs. 16 April 1956. *H. tildeni* (Cherry Flat Res., Santa Clara Co., Calif.).

Gozmány, L. A., "New middle-European Lepidoptera" [in English, Russian summary]. *Acta Biol. Acad. Scient. Hungaricæ,* vol.3: pp.379-386, 13 figs. 1952. Describes as new *SYNACROLOXIS* (Scythrididæ) and type *S. dis* (Szenta, Hungary); *Elachista edithæ* (Grado, Dalmatia); *Epermenia notodoxa* (Fiume, Tersato); Parornix *szöczi* (Budapest) (with key to related species); *Solenobia wagneri* (Mt. Czibles, Rumania). [P.B.]

Gozmány, L. A., "Studies on Microlepidoptera" [in English, Hungarian summary]. *Ann. Hist.-Nat. Mus. Nat. Hungarici,* n.s., vol.5: pp.273-285, 34 figs. 1954. Describes as new *OPOROPSAMMA* (Tortricidæ; type *Cnephasia wertheimsteini*); *Oxypteron* (*PSAMMOZESTA*), and type *O.* (*P.*) *neogena* (Montarco, Madrid Prov., Spain); *Megacraspedus jablonkayi* (Farkasvölgy, Budapest); *Metzneria éhikeella* (Ágasegyháza, S. Hungary); *Glyphipteryx náttani* (Káposvar); *Gnorimoschema census* (Hársbokorhegy, Budapest); *Bubulcellodes amseli* (Murcia, Spain); *Holoscolia homaima* (Mt. Korab, Albania); *Eupista etelka* (Usza, Bakony Mts., W. Hungary), *E. eupepla* (P. Peszer, Hungary); *Apatetris agenjoi* (Murcia, Spain); *PANTACORDIS* (Gelechiidæ), and type *P. pales* (Hársbokorhegy, Budapest). [P.B.]

Gozmány, L. A., "Notes on Microlepidoptera" [in English, Russian summary]. *Acta Zool. Acad. Scient. Hungaricæ,* vol.1: pp.231-233, 2 figs. 1955. Describes as new *Eupista hungariæ* (L. Velence, near Pákodz, Hungary); *E. interrupta* (Zengg, Dalmatia). Sinks his *E. etelka* to *E. sylvaticella,* and his *Pantacordis* to *Eremica.* [P.B.]

Gozmány, L. A., "Notes on some Hungarian Gelechioidea and Coleophoridæ" [in English, Hungarian summary]. *Ann. Hist.-Nat. Mus. Nat. Hungarici,* n.s., vol.6: pp.308-320, 24 figs. 1955. Assigns Hungarian spp. of *"Gelechia"* to 12 genera, including *ORNATIVALVA* (type *G. plutelliformis*), *NEOFACULTA* (type *G. infernalis*), and *MIRIFICARMA* (type *G. maculatella* Hbn.); redefines 11 genera; gives keys to the 12, based on genitalia. Records of 3 other spp. of Gelechiidæ. Annotated list of Hungarian spp. belonging to group M of *Coleophora.* [P.B.]

Gregor, F., & D. Povolný, "Neue und interessante Lepidopteren aus der Tsechoslowakei" [in Czech, Russian & German summaries]. *Acta Mus. Moraviæ,* vol.40: pp.114-129, 11 pls., 82 figs. 1955. Describes as new *Gelechia dzieduszyckii tatrica* (High Tatra, N. Slovakia). Discusses the systematic position of *Mesophleps trinotellus.* Records from Czechoslovakia 19 spp. of Frenatæ; figures adults and genitalia. [J.M.]

Grey, L. P., Alexander B. Klots, & Cyril F. dos Passos, "The *niobe/cydippe/adippe* problem (Class Insecta, Order Lepidoptera, Family Nymphalidæ) with suggestions for its solution." *Bull. Zool. Nomencl.,* vol.6: pp.323-325. 29 Aug. 1952. Proposes selection of *adippe* D. & S., 1775, as the correct name for the High Brown Fritillary, and suppression of *cydippe* and *berecynthia* for this species and of *adippe* as used in other senses. [P.B.]

Hansson, B. H., "Über eine neue, schwedische Unterart von *Aporophyla lutulenta* (Bkh.) und ihre Beziehungen zu den übrigen Formen" [in German]. *Ent Tidskr.,* vol.73: pp.77-88, 2 figs. 10 May 1952. Describes as new *A. l. insularis* (Öland Is., Sweden); also names 2 "forms." Compares new race with others, figuring adults and ♂ genitalia. [P.B.]

Heinrich, Carl, "American moths of the subfamily Phycitinæ." *U.S. Natl. Mus. Bull.* no.207: viii + 581 pp., 1138 figs. 1956. Describes as new *ANABASIS* (type *Myelois achrodesma*); *Sematoneura abitus* (Alpayacu, Río Pastaza, E. Ecuador); *CUNIBERTA* (type *Nephopteryx subtinctella*); *HERAS,* and type *H. disjunctus* (Don Amo, Colombia); *ADANARSA,* (type *Rhodophæa intransitella*); *BIRINUS,* and type *B. russeolus* (Tumatumari, Potaro R., Br. Guiana); CHARARICA (type *Myelois annuliferella*); *MYELOPSIS* (type *Myelois coniella*); *APOMYELOIS* (type *Dioryctria bistriatella*); *ECTOMYELOIS* (type *Myelois decolor*), *E. zeteki* (near Capira, Panama; on *Cassia moschata*); *PARAMYELOIS* (type *Myelois solitella* = *Nephopteryx transitella*); *PROTOMOERBES,* and type *P. aberrans* (Colombia), *P. separabilis* (San Antonio, Colombia); *Diatomocera majuscula* (Ponta Nova, Rio Xingu, Amazonas, Brazil), *D. albosigno* ("S. E. Brazil"), *D. extracta* (Tuis, Costa Rica); *PSEUDOCABIMA* (type *Myelois euzopherella*), *P. castronalis* (Castro, Paraná, Brazil), *P. guianalis* (Sr. Jean Maroni, Fr. Guiana), *P. arizonensis* (Redington, Ariz.); *Hyalospila insequens* (Incachaca, Cochabamba, Bolivia), *H. majorina* (Misantla, Mexico), *H. fulgidula* (Santiago Prov., Cuba); *Difundella distractor* (Palmas Abojas, Puerto Rico), *D. tolerata* (E. Bolivia); *Anadelosemia condigna* (Prescott, Ariz.); *Rampylla lophotalis* (Jalapa, Mex.); *FULRADA* (type *Dasypyga querna*); *SCORYLUS,* and type *S. cubensis* (Santiago Prov., Cuba); *Davara (?) interjecta* (El Yunque, Luquillo Mts., Puerto Rico); *Piesmopoda parva* (La Chorrera, Panama): *ATHELOCA* (type *Nephopteryx subrufella*), *A. bondari* (Baía, Brazil); *PRAEDONULA* (type *Phycita almonella*) : *PEADUS* (type *Piesmopoda burdetella*), *P. dissitus* ("S. E. Brazil"); *GABINIUS* (type *Promylea paulsoni*); *Megarthria squamifera* (Mt. Poás, Costa Rica), *M. frustrator* (Juan Viñas, Costa Rica), *M. schausi* (Juan Viñas, Costa Rica), *M. alpha* (Volcán Santa María, Guatemala), *M. beta* (Orizaba, Mex.); *Zamagiria fraterna* (Santiago de las Vegas, Cuba); *MAGIRIOPSIS* (type *Sematoneura denticosella*); *CARISTANIUS* (type *Oligochroa pallucidella*); *Pima albiplagiatella occidentalis* (Pullman, Wash.); *INTERJECTIO* (type *Ambesa colubiella*); *SALEBRIACUS* (type *Nephopteryx odiosella*); *SALEBRARIA* (type *Salebria ademptandella*); *QUASISALEBRIA,* and type *Q. admixta* (Provo, Utah); *Meroptera abditiva* (Knowlton, Que.); *Nephopteryx delassalis fraudifera* (Oliver, B. C.), *N. dammersi* (Cajon Valley, San Bernardino Valley, Calif.), *N. d. floridensis* (Williamsburg, Fla.); *TULSA* (type *Nephopteryx finitella*); *TELETHUSIA* (type *Pempelia ovalis*); *PHOBUS* (type *Dioryctria brucei*), *P. incertus* (Strawberry Valley, San Jacinto Mts., Calif.); *ACTRIX* (type *Tacoma nyssæcolella*), *A. dissimulatrix* (Cape Henry, Va.; on *Nyssa sylvatica*); *Stylopalpia argentinensis* ("Villa Anna, F. S. C. Fe., Argentina"); *Pyla impostor* (Slate Peak, Whatcom Co., Wash.), *P. æquivoca* (Banff, Alta., Canada), *P. insinuatrix* (Aweme, Manitoba, Canada), *P. ænigmatica* (Wellington, B. C.), *P. nigricula* (Verdi, Nev.); *Dioryctria baumhoferi* (Prescott, Ariz.), *D. subtracta* (Ft. Wingate, N. Mex.); *Sarata punctella septentrionaria* (Palmerlee, Ariz.), *S. alpha* (Oxbow, Sask., Canada), *S. beta* (Colorado), *S. gamma* (California), *S. iota* (California), *S. epsilon* (Yosemite, Calif.), *S. phi* (White Mts., Ariz.), *S. kappa* (Arizona), *S. delta* (N. America); *PHILODEMA* (type *Sarata rhoiella*); *ADELPHIA* (type *Pempelia petrella*); *TOTA* (type *Elasmopalpus galdinella*); *Ufa senta* (Big Bend, Tex.); *ADELPERGA* (type *Heterographis cordubensiella*); *Eumysia semicana* (Yakima, Wash.); *Divitiaca parvulella consociata* (Valle de Medellín, Colombia); *PROTASIA* (type *Valdivia mirabilicornella*); *HONORINUS*, and type *H. fuliginosus* (Angasmarca, Peru); *PATRICIOLA*, and type *P. semicana* (Provo, Utah); *PACONIUS*, and type *P. corniculatus* San Germán, Puerto Rico); *APTUNGA* (type *Vitula macroposa*); *ANDERIDA* (type *Euzophera sonorella*); *CASSIANA* (type *Vitula malacella*); *Mescinia moorei* (Mon Repos, Br. Guiana); *Homœosoma oslarellum breviplicitum* (San Diego, Calif.), *H. illuviellum emendator* (Chimney Gulch, Golden, Colo.), *H. imitator* (Palm Springs, Riverside Co., Calif.), *H. deceptorum* (New Brighton, Pa.), *H. discrebile* ("S. E. Brazil"), *H. peregrinum* (Carmel, Calif.), *H. vepallidum* ("Villa Ana, F. C. S. F.," Argentina), *H. assitum* (Cañete, Peru); *ROTRUDA* (type *Homœosoma mucidellum*); *Unadilla floridensis* (Key West, Fla.); *BAPHALA* (type *Euzophera homœosomella*), *B. goyensis olivacea* (Posadas, Argentina), *B. haywardi* (Concordia, Entre Ríos, Argentina); *RHAGEA* (type *Zophodia packardella*); *LASCELINA*, and type *L. canens* (Brownsville, Tex.); *SELGA* (type *Heterographis arizonella*); *Entmemacornis pulla* (Sta. Catarina, Brazil); *RIOJA*, and type *R. nexa* (La Rioja, Argentina); *Mœrbes emendata* (Cabima, Panama); *Moodnopsis parallela* (Sta. Catarina, Brazil), *M. portoricensis* (Lares, Puerto Rico); *EXUPERIUS*, and type *E. negator* (La Chorerra, Patamayo District, Peru); *EULOGIA* (type *Ephestia ochrifrontella*); *PROSOEUZOPHERA* (type *Euzophera impletella*); *FARNOBIA* (type *Euzophera quadripuncta*); *GENNADIUS*, and type *G. junctor* (St. Jean Maroni, F. Guiana); *Ephestiodes erasa* (Lake Alfred, Fla.); *Vitula pinei* (Eureka, Utah); *Manhatta broweri* (Bar Harbor, Maine); *VERINA* (type *Moodna supplicella*); *VAGOBANTA* (type *Cryptoblables divergens*); *MOODNELLA*, and type *M. paula* (Guatemala City, Guatemala); *VOLATICA* (type *Zophodia pachytæniella*), *V. trinitatis* (Fyzabad, Trinidad); *VEZINA*, and type *V. parasitaria* (José C. Paz, Prov. Buenos Aires, Argentina); *Caudellia clara* (El Yunque, Luquillo Mts., Puerto Rico); *SOSIPATRA* (type *Ephestia rileyella*); *Ribua contigua* (Dorado, Puerto Rico); *ANAGASTA* (type *Ephestia kühniella*); *Varneria dubia* (El Yunque, Loquillo Mts., Puerto Rico); *ERELIEVA* (type *Pempelia quantulella*); *RABIRIA* (type *Microphycita conops*). Revision of American species of the subfamily. Some new synonymy and many generic transfers. Keys to genera; descriptions of all spp., with figures of venation and genitalia. Known foodplants listed. List of unplaced or unrecognized spp., and of spp. transferred to Epipaschiidæ or Anerastiinæ. Checklist of American Phycitinæ, with species ranges. [P.B].

Hemming, Francis, "On the question whether eight generic names in the order Lepidoptera (Class Insecta) commonly accepted as having been first published by Fabricius in 1807 were published by Illiger earlier in the same year." *Bull. Zool. Nomencl.*, vol.1: pp.261-269. 31 March 1947. Application for a ruling that the names *Apatura*, *Castnia*, *Emesis*, *Helicopsis*, *Neptis*, *Nymphidium*, *Pontia*, and *Urania* are to be considered as having been published first by Fabricius, to avoid the possibility of a change of type species in several genera. [P.B.]

Hemming, Francis, "On the lepidopterological implications of Dr. L. B. Holthius' application relating to the name *Sicyonia* Milne Edwards, 1830 (Class Crustacea, Order Decapoda), with a supplementary proposal." *Bull. Zool. Nomencl.*, vol.6: pp.341-342. 29 Aug. 1952. Agrees that validation of this name and suppression of *Sicyonia* Hbn., 1816 (a subjective synonym of *Heliconius*) would involve no inconvenience to students of Lepidoptera; suggests that *Heliconius* be placed on the *Official List* and that four objective synonyms be placed on the *Official Index of Rejected and Invalid Generic Names*. [P.B.]

Hemming, Francis, "On the authorship to be attributed to the anonymous work published in Vienna in 1775 under the title *Ankündung eines systematischen Werkes von den Schmetterlingen der Wiener Gegend*." *Bull. Zool. Nomencl.*, vol.9: p.135. 30 Dec. 1952. Authors cited as "Denis & Schiffermüller." [P.B.]

Hemming, Francis, "On the consequential action in regard to the generic name *Tinæa* Geoffroy, 1762 (Class Insecta, Order Lepidoptera) which would be needed in the event of approval being given to Dr. John G. Franclemont's proposal that the name *Tinea* should be validated under the Plenary Powers as from Linnæus, 1758." *Bull. Zool. Nomencl.*, vol.9: p.152. 30 Dec. 1952. Plenary Powers would have to be used to validate *Tinæa* (since the work in which it was published has been rejected); if Franclemont's proposal is accepted, *Tinæa* need only be placed on the *Official Index*. [P.B.]

Heming, Francis, "Preliminary report on twenty-eight individual nomenclatorial problems remitted by the International Commission on Zoological Nomenclature for special investigation: request to specialists for advice." *Bull. Zool. Nomencl.,* vol.7: pp.191-229. 15 April 1952. Including the disposition of type species of the genera published in Hübner's *Tentamen,* and the relative priority of the publications of Cramer, Denis & Schiffermüller, Fabricius, and von Rottemburg, dated 1775. [P.B.]

Hemming, Francis, "On the need for an amendment of the decision taken in 1948 regarding the method to be followed in identifying the taxonomic species represented by the nominal species *Papilio plexippus* Linnaeus, 1758 (Class Insecta, Order Lepidoptera)." *Bull. Zool. Nomencl.,* vol.6: pp.284-285. 23 July 1952.

Hemming, Francis, N. D. Riley, & Roger Verity, "Proposed use of the Plenary Powers to determine the trivial name to be applied to the species of the genus *Fabriciana,* Reuss, 1920 (Class Insecta, Order Lepidoptera) known in England as the 'High Brown Fritillary' and formerly known by the scientific name *Argynnis adippe* (Linnaeus, 1767)." *Bull. Zool. Nomencl.,* vol.6: pp.325-336. 29 Aug. 1952. Proposes retention of *adippe* D. & S. for this species. [P.B.]

Herbulot, Cl., "Nouveaux Sterrhinæ de Madagascar (Lepid. Geometridæ)" [in French]. *Nat. Malgache,* vol.7: pp.181-189, 1 pl., 11 figs. Feb. 1956. Describes as new *Sterrha brevissimipes, S. prosartema; Scopula prisia, S. dimœroides, S. clandestina, S. abolita, S. normalis, S. sanguinifissa, S. protecta* (all from central Madagascar), *S. antankarana* (N. Madagascar), *S. hæratica* (S. Madagascar). [P.V.]

Hering, Erich Martin, "Support for the proposal submitted by the late Dr. Steven Corbet for the suppression of the trivial name *ajax* Linnaeus, 1758 (as published in the binominal combination *Papilio ajax*) (Class Insecta, Order Lepidoptera)." *Bull. Zool. Nomencl.,* vol.2: p.350. 28 Sept. 1951.

Hering, Erich Martin, "Synopsis der Afrikanischen Gattungen der Cochliidæ (Lepidoptera)" [in German]. *Trans. Roy. Ent. Soc. London,* vol.107: pp.209-225. 6 Dec. 1955. Describes as new (type spp. in parentheses): *AFRALTHA* (*Altha chionostola*); *AFROBIRTHAMA* (*Narosa flaccidia*); *AFRONAROSA* (*N. africana*); *JORDANIANA* (*Niphadolepsis lactea*); *LATOIOLA* (*Latoia albipuncta*); *LEMURIA* (*Miresa gracilis*); *SUSICINA* (*Susica pyrocausta*); *THOSEIDEA* (*Thosea lineapunctata*); *XANTHOPTERYX* (*Susica confusa*). Redefines family and distinguishes Epipyropidæ and Metarbelidæ. Sinks *Asteria* and *Parasa* to *Latoia, Scirrhoma* in part to *Hadraphe* and in part to *Andrallochroma;* refers *Adrallia* to Lymantriidæ. Key to Crothæminæ and Cochlidiinæ, and to Ethiopian genera and those extralimital genera to which African species have been referred; generotypes listed. Palæarctic (North African) genera, and 6 genera which are insufficiently described, are omitted. [P.B.]

Heslop, I. R. P., "First supplement to the 'Indexed checklist of the British Lepidoptera with the English name of each of the 2,313 species' (1947)." *Ent. Gaz.,* vol.4: pp.29-33. 16 Jan. 1953. Includes 38 additional species, 3 changes of name or status, and minor corrections. [P.B.]

Heslop, I. R. P., "Second supplement to the 'Indexed checklist of the British Lepidoptera, with the English name of each of the 2,313 species' (1947)." *Ent. Gaz.,* vol.4: p.265. Oct. 1953. Lists 9 additions made in 1952. [P.B.]

Heslop, I. R. P., "Third supplement to the 'Indexed checklist of the British Lepidoptera, with the English name of each of the 2,313 species' (1947)." *Ent. Gaz.,* vol.6: pp.231-232. Oct. 1955. List of 9 spp. added in 1953 and 1954. [P.B.]

Hinton, H. E., "On the taxonomic position of the Acrolophinæ, with a description of the larva of *Acrolophus rupestris* Walshingham (Lepidoptera: Tineidæ)." *Trans Roy. Ent. Soc. London,* vol.107: pp.227-231, 12 figs. 6 Dec. 1955. Key to the 4 subfamilies of Tineidæ (Acrolophinæ, Scardinæ, Nemapogoninæ, Tineinæ) based on larval characters. [P.B.]

Hinton, H. E., & A. Steven Corbet, *Common insect pests of stored food products. A guide to their identification.* 3rd ed. 61 pp., 126 figs. London: British Museum (Natural History) (Econ. ser. no.15). 1955. Keys to 20 spp. (Pyralidina, Tineina), larvæ and adults; figures of wing patterns and of some genitalia and larval setal patterns. [P.B.]

Huggins, H. C., "The Irish sub-species of *Alucita icterodactyla* Mann (Lep: Pterophoridæ)." *Ent. Gaz.,* vol.6: pp.124-126. 13 July 1955. Describes as new *A. i. phillipsi* (Burren, [Co. Clare]). [P.B.]

International Commission on Zoological Nomenclature, "Direction 2. Addition to the *Official Lists* and *Official Indexes* of certain scientific names dealt with in Opinions 161 to 181." *Opin. Decl. Intern. Comm.,* vol.2: pp.613-628. 21 May 1954. Placed on the *Official Lists*: *Argyreus* Scopoli, 1777 (not available for use in preference to *Argynnis* Fabr., 1807); *Symphædra* Hbn., 1818 (not available for use in preference to *Euthalia* Hbn., 1818); *Princeps* Hbn., [1807]; *paphia* Linn., 1758; *hyperbius* Linn., 1763; *lubentina* Cramer, 1819; *nais* Forster, 1771; *demodocus* Esper, [1798]. Placed on Official Index (rejected): *Limnas* Hbn., [1806]. [P.B.]

International Commission on Zoological Nomenclature, "Direction 4. Addition to the *Official Lists* and *Official Indexes* of certain scientific names and of the titles of certain books dealt with in *Opinions* 134-160, exclusive of *Opinion* 149." *Opin. Decl. Intern. Comm.*, vol.2: pp.629-651. 1 Oct. 1954. Placed on appropriate *Official Lists*: *Cynthia* Fabr., 1807 (not to be used in preference to *Vanessa* Fabr., 1807); *achilles* Linn., 1758 (type of *Morpho*); *cardui* Linn., 1758 (type of *Cynthia*); *actæa* Esper., [1780] (type of *Satyrus*); *hyale* Linn., 1758 (type of *Colias*); *atalanta* Linn., 1758 (type of *Vanessa*); Freyer, *Neue Beiträge zur Schmetterlingskunde;* Latreille, *Considérations générales sur l'ordre naturel des animaux* etc.; Fabricius, "*Die neuerste Gattungs-Eintheilung der Schmetterlinge*" etc. (1807); Hübner, *Sammlung exotischer Schmetterlinge* and *Verzeichniss bekannter Schmettlinge.* Placed on *Official Index* (rejected): *Potamis* & *Rusticus* Hbn., [1807]. [P.B.]

International Commission on Zoological Nomenclature, "Direction 7. Determination of the gender to be attributed to certain generic names placed on the *Official List of Generic Names in Zoology*" by the rulings given in Opinions 134 to 181." *Opin. Decl. Intern. Comm.*, vol.2: pp.685-696. 6 Dec. 1954. Includes *Satyrus* (masculine); *Argynnis, Colias, Euplœa, Euthalia, Helicopis, Pontia, Vanessa* (feminine); *Nymphidium* (neuter). [P.B.]

International Commission on Zoological Nomenclature, "Direction 9. Determination of the gender to be attributed to six generic names placed on the *Official List of Generic Names in Zoology* by rulings given in *Opinions* 137, 149 and 154." *Opin. Decl. Intern. Comm.*, vol.2: pp.705-718. 6 Dec. 1954. Including *Morpho* (feminine). [P.B.]

International Commission on Zoological Nomenclature, "Direction 54. Addition to the *Official List of Family-Group Names in Zoology*, or, as the case may be, to the *Official Index of Rejected and Invalid Family-Group Names in Zoology* of the family-group names involved in the cases dealt with in Volume 12 of the *Opinions and Declarations rendered by the International Commission on Zoological Nomenclature*, other than family-group names already dealt with in these *Opinions*." *Opin. Decl. Intern. Comm.*, vol.12: pp.457-470. 17 Sept. 1956. Added to *Official List:* Heliconiidæ Swainson, 1827; Melanargiinæ Verity, 1920. Added to *Official Index*: Heliconidæ Swainson, 1827 (invalid spelling); Agapetinæ Verity, 1953. [P.B.]

International Commission on Zoological Nomenclature, "Opinion 181. On the type of the genus *Carcharodus* Hübner, [1819], and its synonym *Spilothyrus* Duponchel, 1835 (Class Insecta, Order Lepidoptera), genera based upon an erroneously determined species." *Opin. Decl. Intern. Comm.*, vol.2: pp.589-612. 28 Feb. 1947. The type of both genera is declared, under suspension of the Rules, to be *Papilio alceæ* Esper (*malvæ* of Hübner and others, not of Linnæus). [P.B.]

International Commission on Zoological Nomenclature, "Opinion 263. Designation, under the Plenary Powers, of a description to represent the lectotype of the nominal species *Papilio podalirius* Linnæus, 1758 (Class Insecta, Order Lepidoptera)." *Opin. Decl. Intern. Comm.*, vol.5: pp.329-342. 10 Aug. 1954. Designation is Ray, *Hist. Ins.*: III, n.3; type locality Livorno, Tuscany. Placed on Official List: *podalirius; feistamelii* Duponchel, 1832. [P.B.]

International Commission on Zoological Nomenclature, "Opinion 264. Designation, under the Plenary Powers, of a figure to represent the lectotype of the nominal species *Papilio iris* Linnæus, 1758 (Class Insecta, Order Lepidoptera)." *Opin. Decl. Intern. Comm.*, vol.5: pp.343-354. 10 Aug. 1954. Designation is fig. 1, pl.29 in South, *The Butterflies of the British Isles;* type locality is "England." Placed on the Official List: *ilia* [Schiffermüller & Denis], 1775. [P.B.]

International Commission on Zoological Nomenclature, "Opinion 265. Validation, under the Plenary Powers, of the specific names *aristolochiæ* Fabricius, 1775, as published in the combination *Papilio aristolochiæ* and *ascanius* Cramer, [1775], as published in the combination *Papilio ascanius* (Class Insecta, Order Lepidoptera)." *Opin. Decl. Intern. Comm.*, vol.5: pp.355-366. 10 Aug. 1954. Names placed on *Official List; ascanius* Linn., 1768, and *aristolochiæ* Pallas are placed on *Official Index* (rejected). [P.B.]

International Commission on Zoological Nomenclature, "Opinion 267. Rejection of a proposal for the validation, under the Plenary Powers, of the generic name *Porina* Walker, 1856 (Class Insecta, Order Lepidoptera) by the suppression thereunder of the generic name *Porina* d'Orbigny, 1852 (Class Bryozoa)." *Opin. Decl. Intern. Comm.*, vol.5: pp.387-396. 10 Aug. 1954. *Oxycanus*, the earliest available name for this genus of Lepidoptera, and its type species *australis* are placed on the appropriate *Official Lists*. [P.B.]

International Commission on Zoological Nomenclature, "Opinion 269. Validation, under the Plenary Powers, of the specific name *idas* Linnæus, 1761, as published in the combination *Papilio idas*, and determination of the species represented by the nominal species *Papilio idas* Linnæus, 1761, *Papilio argyrognomon* Bergsträsser, [1779], and *Papilio argus* Linnæus, 1758 (Class Insecta, Order Lepidoptera)." *Opin. Decl. Intern. Comm.*, vol.6: pp.1-24, 1 pl. 10 Sept. 1954. Suppresses *idas* Linnæus, 1758; places *idas* Linnæus, 1761, *argyrognomon*, and *argus* on the Official List; selects figures of ♂ genitalia to be used as standards in determining the spp. (these published figures are reproduced in this *Opinion*). [P.B.]

International Commission on Zoological Nomenclature, "Opinion 270. Addition to the *Official List of Generic Names in Zoology* of the names of five nominal genera of butterflies (Class Insecta, Order Lepidoptera), originally established with misidentified type species, for which type species in harmony with accustomed usage were designated under the Plenary Powers in 1935." *Opin. Decl. Intern. Comm.*, vol.6: pp.25-40. 10 Sept. 1954. Placed on *Official Lists*: *Agriades, Carcharodes, Euchloë, Lycæides, Polyommatus; alceæ* Esper, *creusa* Doubleday, *esperi* Kirby, *orientalis* Bremer. Placed on Official Index: *Latiorina* Tutt, *Orpheides* Hbn., *Spilothyrus* Duponchel. [P.B.]

International Commission on Zoological Nomenclature, "Opinion 275. Determination of the type species of the nominal genus *Amblypterus* Hübner [1819] (Class Insecta, Order Lepidoptera)." *Opin. Decl. Intern. Comm.*, vol.6: pp.83-94. 10 Sept. 1954. Type is *Sphinx panopus* Cramer. *Amblypterus* and *panopus* placed on the *Official Lists*. [P.B.]

International Commission on Zoological Nomenclature, "Opinion 276. Rejection, as not being of subgeneric status, of the intermediate terms used by Hübner (J.) between the generic and specific names of species in the first volume of the work entitled *Sammlung exotischer Schmetterlinge*, published in the period 1806-1823, and also in the work entitled *Systematischalphabetisches Verzeichniss aller bisher bei den Fürbildungen zur Sammlung europäischer Schmetterlinge angegebenen Gattungsbenennungen* published in 1822." *Opin. Decl. Intern. Comm.*, vol.6: pp.95-118. 1 Oct. 1954. These works also placed on *Official List of Works Approved as Available for Zoological Nomenclature*. [P.B.]

International Commission on Zoological Nomenclature, "Opinion 278. Addition to the *Official List of Generic Names in Zoology* of the names of ten genera of the Sub-Order Rhopalocera of the Order Lepidoptera (Class Insecta), species of which were cited in the undated leaflet commonly known as the *Tentamen*, prepared by Jacob Hübner, which is believed to have been distributed to correspondents in 1806, a leaflet rejected in Opinion 97." *Bull. Zool. Nomencl.*, vol.6: pp.135-178. 1 Oct. 1954. Hübner's generic names of butterflies are placed on the *Official Index*. The genera to which their type species are now referred, and the types of these genera, are placed on the *Official Lists* (if not already done): *Aulocera, Consul, Danaus, Euphydryas, Limenitis, Nymphalis, Papilio, Pieris, Plebejus, Pyrgus; brahminus, fabius, phaeton, populi, polychloros, machaon, brassicæ, malvæ.* The *Tentamen* is placed on the *Official Index*. [P.B.]

F. BIOLOGY AND IMMATURE STAGES

Anonymous, "The Beet Web-Worm (*Hymenia recurvalis*)." *Agric. Gaz. N. S. Wales*, vol.61: p.256, 1 fig. 1 May 1950. Life history & control.

Anonymous, "Insect pests of tobacco." *Agric. Gaz. N. S. Wales*, vol. 61: pp. 415-418, 6 figs. 1 Aug. 1950. *Gnorimoschema operculella, G. plæsiosema, Plusia* sp., *Heliothis armigera*, cutworms; biology and control. [P. B.]

Anonymous, "The Fruit-Tree Moth Borer (*Maroga unipunctata*)." *Agric. Gaz. N. S. Wales*, vol. 61: pp. 583-584, 3 figs. 1 Nov. 1950. Biology and control (Xyloryctidæ).

Anonymous, "The Tomato Caterpillar (*Heliothis armigera*)." *Agric. Gaz. N. S. Wales*, vol. 61: pp. 641-642, 4 figs. 1 Dec. 1950. Biology and control.

Anonymous, "The Indian Meal Moth (*Plodia interpunctella*)." *Agric. Gaz. N. S. Wales*, vol. 62: pp. 41-42, 2 figs. 1 Jan. 1951. Biology and control.

Anonymous, "The Cabbage Moth (*Plutella maculipennis*). The Cabbage White Butterfly (*Pieris rapæ*). Case Moths (Psychidæ)." *Agric. Gaz. N. S. Wales,* vol. 62: pp. 149-152, 156, 7 figs. 1 Mar. 1951. Biology and control.

Anonymous, "The White Cedar Moth (*Lymantria reducta*)." *Agric. Gaz. N. S. Wales,* vol. 62: p. 190, 1 fig. 1951. Biology and control; on *Melia azedarach.* [P. B.]

Anonymous, "The Currant Stem-borer (*Ægeria tipuliformis*)." *Agric. Gaz. N. S. Wales,* vol. 62: p. 304, 1 fig. 1 June 1951. Biology and control.

Dikasova, E. T., "Serodiagnosis of jaundice virus in *Bombyx mori*" [in Russian]. *Mikrobiologiia,* vol. 17:pp. 189-191. 1948. [Not seen.]

Dikasova, E. T., "Effect of virus of yellow jaundice on the viability of Mulberry Silkworm" [in Russian]. *Mikrobiologiia,* vol. 19: pp. 444-448. 1950. [Not seen.]

Eberle, Georg, "Kleine Lebensgeschichte des Heide-Ringelspinners (*Malacosoma castrensis*)" [in German]. *Natur und Volk,* vol. 77: pp. 62-71, 7 figs. May 1947. Life history, ecology, and behavior.

Eberle, Georg, "Rittersporn-Eule" [in German]. *Natur und Volk,* vol. 79: pp. 85-89, 4 figs. 15 Apr. 1949. Life history of *Plusia moneta;* foodplants *Delphinium* and *Aconitum.* [P. B.]

Eberle, Georg, "Vom Windenschwärmer" [in German]. *Natur und Volk,* vol. 81: pp. 121-126, 5 figs. 1 June 1951. Life history and habits of *Herse convolvuli.* [P. B.]

Eff, Donald, "The foodplant of *Erynnis pacuvius.*" *Lepid. News,* vol. 9: p. 15. 8 April 1955.

Efimov, A. L., & G. M. Miftakov, "Pink bollworm and other pests of cotton in China" [in Russian]. *Zool. Zhurn.,* vol. 33: pp. 1065-1080. Sept./Oct. 1954. [Not seen].

Egle, Karl, "Pilze als Insektentöter" [in German]. *Natur und Volk,* vol. 79: pp. 286-290, 3 figs. 15 Dec. 1949. Entomophagous fungi on Lepidoptera and other insects. [P. B.]

Ene, M., & D. Parascan, "*Apterona crenulella* Brd., an enemy of the forests" [in Rumanian]. *Revista Padurilor,* vol. 68, no. 2: pp. 19-21. Feb. 1953. [Not seen.]

Evans, J. W., *The injurious insects of the British Commonwealth (except the British Isles, India and Pakistan). With a section on the control of weeds by insects.* vii + 242 pp., 1 pl. London: Commonwealth Institute of Entomology. 1952. Lists insects in systematic order (in case of Lepidoptera), with area where destructive, notes on habits and control, and reference to abstracts in the *Review of Applied Entomology.* Some 350 Lepidoptera in 41 families are mentioned. Pests are also listed by plant attacked. [P. B.]

Fennah, R. G., *The insect pests of food crops in the Lesser Antilles.* 209 pp., 139 figs. Dept. of Agriculture, Grenada. 1947. Life history, distribution, alternative foodplants, and parasites of pest insects, arranged by plant species. Some adults figured. [P.B.]

Ferreira Lima, A. D., "Insetos fitófagos de Santa Catarina" [in Portuguese]. *Bol. Fitossanit.,* vol. 2: pp. 233-251. "1945" [1947]. Annotated lists of plant-feeding species (and a few parasites) including 85 Lepidoptera in 32 families. Food plant index. [P. B.]

Ferriére, Ch., "Les parasites de *Lyonetia clerckella*" [in French]. *Trans. 9th Int. Congr. Ent.,* vol. 1: pp. 593-595. March 1953. Records 11 chalcidid parasites and a few others, from Switzerland. [A. D.]

Figueroa Potes, Adalberto, "La ruptura de un equilibrio. Consideraciones biologicas alrededor del uso de los nuevos insecticidos" [in Spanish]. *Rev. Acad. Colomb. Cien.,* vol. 9, nos. 33/34: 92-102. May 1953. Discusses parasites and predators of destructive insects in Colombia, including *Opsiphanes invinæ, Tysiphone maculata,* and some better-known Lepidoptera, and the adverse effects of insecticides on biological control. [P. B.]

Filatova, Z. A., "On the taxonomic position of the microsporidian organism causing pebrine in *Antheræa pernyi* G." [in Russian]. *Bull. Moskov. Obshch. Isp. Prirody, Otd. Biol.,* vol. 52: pp. 3-10. 1947. [Not seen.]

Finn, Pearl Staples, "Caterpillars have wings." *Everglades Nat. Hist.,* vol. 3: pp. 120-122, 1 fig. June 1955. Popular account of metamorphosis. [P. B.]

Fischer, Franz, "Zur Zucht der Raupen von *Heliothis scutosa* Schiff." [in German]. *Ent. Nachrbl.,* vol. 3: pp. 183-184. Oct./Nov. 1951. *Anthemis arvensis,* as well as *Artemisia* spp., normal foodplants. [P. B.]

Fogg, G. E., "Biological flora of the British Isles. *Sinapis arvensis* L." *Journ. Ecol.,* vol.38: pp.415-429, 3 figs. Nov. 1950. Larval food plant of *Euchloe cardamines, Pieris rapæ, P. brassicæ, Mamestra brassicæ, Evergestis straminalis, E. extimalis, Mesographe forficalis, Plutella maculipennis.* Lists spp. visiting flowers also. [P. B.]

NOTICES

Lepidopterists' Society members may use this page free of charge to advertise their offerings and needs in Lepidoptera. The Editors reserve the right to rewrite notices for clarity or to reject unsuitable notices. We cannot guarantee any notices but expect all to be *bona fide.*

I am interested in exchanging, determining, and buying series of *Parnassius* with precise dates of capture. C. Eisner, Kwekerijweg 5, Den Haag, NETHERLANDS.

Attention field collectors: Mrs. Phillips and I are planning a Lepidoptera collecting trip by car to southern Texas, around Brownsville, and possibly into Mexico during the first half of July 1957. Would like others to accompany us to share expenses and the enjoyment of collecting. L. S. Phillips, Biochemistry Dept., Ill. Instit. of Technology, 35 W. 33rd St., Chicago 16, Ill., U.S.A.

Wish to purchase Hesperiidæ, *Catocala*, and Sphingidæ, from U.S. and Canada only. Ray Seibert, 1302 Fairview St., Reading, Pa., U.S.A.

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Wanted: Living pupæ and papered imagoes of world Saturniidæ. Reservation list of Georgia Rhopalocera and Saturniidæ on request. Will buy or exchange any spp. of Rhopalocera or Saturniidæ of world, in small numbers or in quantity. James C. Brooks, 194 Riley Ave., Macon, Georgia, U. S. A.

Wanted: Living ova and pupæ of U.S. Sphingidæ, Notodontidæ, Lasiocampidæ, Ceratocampidæ, Saturniidæ, Arctiidæ, *Catocala*, etc.; almost any spp. desired. Please write stating offers and prices. Leonard V. H. Gingell, South Farnborough School, Reading Road, Farnborough, Hants., ENGLAND.

Wanted: Fertile ova or pupæ of Saturniidæ, common or rare spp., for scientific work in laboratories, research stations, and zoology departments of leading universities in Great Britain. Exchange for British and European Lepidoptera, or exotic material. 10-page price list free. L. Hugh Newman, The Butterfly Farm Ltd., Bexley, Kent, ENGLAND.

A supplier of biological materials, primarily for educational purposes, wishes to establish connections with one or more collectors and preparators who will be able to provide preserved specimens according to directions which the firm will supply. Interested persons should write: United Scientific Company, Inc., 200 North Jefferson Street, Chicago 6, Illinois.

LEPIDOPTERA COLLECTION IN BUDAPEST SAVED

Word has been received from Dr. L. A. GOZMÁNY, curator of Lepidoptera of the Hungarian National Museum in Budapest, that he and his family came through the recent fighting in Hungary uninjured. The great and distinguished Museum, founded in 1802, did not fare so well. Dr. GOZMÁNY, a Vice-President of the Lepidopterists' Society, wrote as follows: "Owing to six mines exploding in the Herpetological Collection, and setting fire to 200,000 litres of alcohol and petroleum, the ensuing conflagration totally burned out the following collections: the Ornithological, Ichthyological, Herpetological, Mollusca, Diptera, Hemiptera, Odonata, Trichoptera, Saltatoria, Lower Invertebrata, etc. Thousands and thousands of types are lost, beside hundreds of thousands of specimens. And now the miracle: amid all this raging Inferno, the Lepidoptera and Coleoptera Collections remained intact! The fire ate away the doors, the window frames and sills, and then it stopped . . . The other building where our Mineralogical, Geological and Paleontological Departments were housed and stored also got some shells, and they got totally destroyed together with tens of thousands of books, their whole library, and every single specimen. Just the charred and blackened walls are standing. The Museum is an irreparable loss, in its 60%. We were given a new building . . . The old building now houses only the Mammalogical and Hymenoptera collections, which were in another wing, and so escaped the fire." Even for the lepidopterists, whose collection remains, the loss of the library is a crushing blow, and specialists in the groups whose collections were destroyed must rebuild them from the beginning as rapidly as possible. There is urgent need for naturalists everywhere to give as much help as possible. Most urgently needed are substantial funds, particularly to allow curators such as Dr. GOZMÁNY to travel to North America and Europe to arrange with foreign colleagues for exchanges and gifts of specimens and for the purchase of literature. Individuals who can participate in any way are urged to write the *News* Editor or directly to Dr. GOZMÁNY.

C. L. REMINGTON

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The object of The Lepidopterists' Society, which was formed in May, 1947, and formally constituted in December, 1950, is "to promote the science of lepidopterology in all its branches, ... to issue a periodical and other publications on Lepidoptera; to facilitate the exchange of specimens and ideas by both the professional worker and the amateur in the field; to secure cooperation in all measures" directed toward these aims (*Constitution,* Art. II). A special goal is to encourage free interchange among the lepidopterists of all countries.

Membership in the Society is open to all persons interested in any aspect of lepidopterology. All members in good standing receive *The Lepidopterists' News.* Institutions may subscribe to the publications but may not become members. Prospective members should send to the Treasurer the full dues for the current year, together with their full name, address, and special lepidopterological interests. All other correspondence concerning membership and general Society business should be addressed to the Secretary. Remittances in dollars should be made payable to *The Lepidopterists' Society.* There are three paying classes of membership:

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Each year a list of members of the Society is published in the *News,* with addresses and special interests. There are six numbers in each volume of the *News.*

All members are expected to vote for officers when mail ballots are distributed by the Secretary each year.

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DIAPAUSE IN HOT ARID CLIMATES

EUREMA DAIRA IN MISSISSIPPI

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(Complete contents on back cover)

21 June 1957

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Contributions to *The Lepidopterists' News* may be on any aspect of the study and collection of Lepidoptera in any part of the world. Particularly solicited are: 1) review papers on subjects of general interest to lepidopterists (*e.g.*, wing venation, mimicry, moth traps); 2) papers on such subjects as pre-adult stages, genetics, behavior, and comparative taxonomy (descriptions of new species and subspecies will be accepted); 3) field notes of more than a very local nature; 4) notes on well-tested techniques. Papers of more than ten pages will not normally be accepted.

Manuscripts should be typed if possible, but clear hand-written manuscripts are acceptable. ALL MANUSCRIPTS SHOULD BE DOUBLE-SPACED (blank lines alternating with written lines), and wide right and left margins are needed. Use only one side of the paper. The author should keep a carbon copy of the manuscript.

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Ordinarily, manuscripts should be in English. However, the editors will attempt to translate short notes which are received in French, German, Spanish, Portuguese, or Russian. Authors of longer manuscripts who do not find English easy should prepare an English manuscript and permit the editors to correct the writing. Brief summaries in non-English languages with roman letters are always welcomed at the end of any paper.

Titles must be kept as short as possible; Latin names of genera and species will be italicized, and authors of such Latin names WILL NOT APPEAR IN THE TITLE of any paper but must appear once in the text. THE STYLE SHOULD CONFORM TO THAT USED IN RECENT ISSUES OF THE *NEWS*. Please note exact style for references. Footnotes should be kept at a minimum. The editors reserve the right to adjust style to fit standards of uniformity.

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WILLIAM HARRY EVANS

Brigadier WILLIAM HARRY EVANS, C. S. I., C. I. E., D. S. O., was born on 22nd July, 1876, at Shillong, Assam, third son of Sir HORACE MOULE EVANS and ELIZABETH ANNE, daughter of Surgeon General J. T. TRESSIDER. His talented mother undoubtedly did much to kindle in him and share with him her own enlightened interest in nature, so that by the time he was sent to King's School, Canterbury, he already had a strong school-boy interest in butterflies and moths. At the age of eighteen he joined the Royal Engineers. He was posted East in 1898, and in that year he was already collecting butterflies in Chitral. His Indian service was interrupted by duty with the Somaliland Expedition (1902-04) where he sustained an injury to his knee when landing, which handicapped him increasingly over the years. He also served in France from 1914 to 1918. In the latter war he not only distinguished himself by being awarded the D.S.O. and a brevet, but as a result of exposure to gas incurred permanent chest trouble. With characteristic doggedness he made light of these handicaps, which did not grow lighter as time passed. Returning to India in 1919, he was stationed at various Command headquarters. His final post was with Western Command at Quetta as Chief Engineer.

Retiring in 1931 he travelled home via Australia, settling in London in 1932, within easy walking distance of the Natural History Museum; yet in a sense his military service did not even then come to an end, for he was attached to the Non-intervention Committee during the Spanish Civil War, and when in the last war troubles came to London, he unobtrusively assumed the job of Air Raid Warden in his own immediate neighborhood. Stoically, as was so very characteristic of him, he put in a full day's work daily at the Museum throughout the war, at a window facing south on to Cromwell Road, where one morning he was caught in the explosion of a German V1 rocket bomb which burst on the roadway about 100 yards away. Cut, bruised, badly shaken and with his hearing seriously affected (permanently, as it later transpired), his only complaint was of the loss of the specimens he had been examining, and of which nothing remained but the pins and labels. However, within hours he was at work again, though it was little short of a miracle that he was not killed. The incident — not uncommon in London at the time — is related because EVANS'S reaction was so typical of him. He had sent his wife to Bournemouth (where she died in 1945) to escape the raids; and he could justifiably have followed her. As for himself, his task was to complete the Revision of the Hesperiidæ of the World, as he so often said "before he died". Often, during his last few years, we wondered, as he did, whether death would win, but the victory was his.

Throughout his service in India, EVANS collected assiduously, so that few men can have had a fuller or more intimate comparative knowledge of the distribution patterns of the Rhopalocera of that vast sub-continent. Ceylon, Kodai Kanal (S. India), Jabalpur, Simla, Murree, Darjeeling, Chitral, Baluchistan were his principal collecting grounds. He also spent at least one highly profitable leave period in Burma, visited Malaya and the Andaman Islands, and twice travelled to Australia, where the Trapetizinæ, a subfamily of peculiar endemic Hesperiid genera, particularly attracted his attention. Owing to the exigencies of army life, EVANS preserved the great bulk of his very extensive material in papers, only setting barely enough for a handy reference collection — and setting was not an art he ever acquired to perfection; red sealing wax, often used to secure wings, does not improve the appearance of specimens!

EVANS'S approach to entomology was essentially practical, methodical, almost matter-of-fact. He was not content solely with the delights of the chase, or the beauty of the quarry; he wanted always to know precisely what it was he caught, how it differed from its related species and where it fitted into the scheme of things. During the twenty-five years that he spent as a close colleague in the Museum he never spoke of the life histories of Indian butterflies as if from personal experience; indeed, in all his writings little will be found on this aspect of the subject. In other words, taxonomy made the strongest appeal to him. In a way this was fortunate for students of the Indian butterflies, the available literature on which was scattered, expensive, voluminous and not always as informative as appearances suggested, for it led EVANS to prepare his *Keys for the Identification of Indian Butterflies.* The *Keys,* published originally in parts in the *Journal of the Bombay Natural History Society,* from 1923, proved at once deservedly popular, were issued in book form in 1927, and again as a revised edition in 1932. For the first time they provided the collector and student in a single volume of some 300 pages with reliable keys to the whole of the families, genera, species and subspecies known to occur in India, Burma and Ceylon. Preceding the actual Keys there is a masterly, concise, practical summary of all the aspects of butterfly collecting in India likely to interest the collector. It is worth careful reading and it throws more light on the author himself than any other of his writings. The clipped, abbreviated text matter of the *Keys* and the rather unattractive half-tone plates do not make an æsthetically pleasing volume; but the success of the Keys was immediate, for they worked. In this work EVANS introduced both the standard set of abbreviations and the rather unorthodox type of Key which he used throughout his later work. For the latter he claimed that it was natural in that it did not rely on 'spot' characters but on true morphologically comparable similarities and differences, and showed simultaneously and continuously the identity of a species and its position in his classification; certain it is that his keys were suited to his mathematical mind and his quite extraordinary faculty for keeping a whole range of related and indeed seemingly unrelated characters in his head simultaneously. He found it quite unnecessary to employ any system of tabulation such as most of us find unavoidable; having 'worked through' a genus, he would write the key virtually without further reference to the specimens on which it was based.

One may perhaps be permitted to wonder why it was that on retirement EVANS selected the Hesperiidæ for his attention. The Lycænidæ were (and still are) almost equally in need of serious overhaul. On a superficial comparison, however, they look 'easier', for clearly they present a great variety of usable 'characters'. The Skippers on this ground alone, however, present a greater challenge, and, besides, there was the vast unorganized assemblage of tropical American species into which nobody had as yet made any serious attempt to introduce order. Here was indeed a challenge worthy of EVANS'S metal; and it is an odd coincidence that the only worthwhile attack ever previously to have been made on the major classification of the Hesperiidæ was also the work of a Sapper, Captain E. Y. WATSON (1893, *Proc. Zool. Soc. London*) who was killed in action before the turn of the century. From the fact that these two workers are in almost complete accordance in their major conclusions much comfort can be drawn by the rest of us.

In the course of preparing his Catalogues of the Hesperiidæ in the British Museum, details of which will be found in the bibliography, EVANS examined critically well over half a million specimens, not counting the very large amount of material which he excluded from the main collection and treated as supplementary. As his classification at specific level, and to a considerable extent at generic level as well, is based on the male genitalia, an astonishingly high proportion of this material was actually dissected and examined by him single-handed. This he achieved by the dry method, often without any visual aid, or at most with the help of a low-powered binocular — for his near sight was quite remarkable, a fact which also accounts, no doubt, for the minuteness of his handwriting. To see this operation in practice made one shudder, but it paid dividends; and such a mass of material could never have been examined in the time by conventional methods. It is inevitable, however, that only the grosser characters can be appreciated so, and just as inevitable is it that when more refined methods are employed much correction of detail will be necessary. Comparisons of the treatment of the palearctic and nearctic Hesperiidæ by EVANS with the work of REVERDIN, WARREN, SKINNER and WILLIAMS, BELL, LINDSEY, and others clearly illustrates the point. This is not to decry EVANS'S work. It has the enormous merit of being a completely comprehensive revision in which the same criteria have been applied throughout, thus providing us with strictly comparable taxa. Whether one regards his Groups as Families or his subspecies as species is immaterial; within each category the values are pretty constant. One regret, however, may be expressed, and that is that EVANS gave us so little in the way of general conclusions that could, surely, have been drawn from his profound knowledge of the Skippers of the World. It may be because, though he was much influenced in later years by the writings of RENSCH, MAYR, HUXLEY and others on evolution and the species concept, he always regarded phylogeny with the greatest suspicion.

Having finished his self-appointed task and completed his work on the Hesperiidæ, EVANS decided to spend his last years helping others interested in the Skippers, tidying up, etc., etc., till with a sudden renewed enthusiasm for the Lycænidæ he revised the difficult genus *Tarucus* and, in a few months, reduced to order the species of the Oriental genus *Arhopala* which had been a stumbling block to others for generations. The manuscript of the latter revision went to press in September 1956. He died, after a short illness, on November 13th, 1956. His only son, Dr. J. W. EVANS, ably maintains the family interest in entomology and is now Director of the Australian Museum, Sydney.

A quarter of a century seems a long time to spend revising a single family of the Lepidoptera. However, but for the fact that EVANS was entirely his own master, free of all official ties and duties (and in consequence not a little envied by the 'permanent' staff, maybe), it would not have sufficed. EVANS at work was quick, accurate, methodical, and true to his Army training, required an answer to be yes or no — he had no use for compromise. Decision was what he sought, not tangential possibilities; and having reached his decision he was adamant, whether it concerned the status of a species or the position of a comma — which was a pity, for it sometimes led him, and not only him, to unnecessary heart-burnings. Nevertheless he was an endearing character, likeable, deservedly popular, suffering children (whom he enchanted) gladly, but not fools, and utterly dependable.

The Department, of which he was an 'institution' for so long, more regular than the regulars, will for many years cherish the warmest memories of 'the Brigadier'.

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[Editor's note: Brigadier EVANS was one of the five original Honorary Life Members of the Lepidopterists' Society. Prior to completion of the final part of his catalogue of the American Hesperiidæ, he had agreed to prepare for publication in the *Lepidopterists' News* a summary paper setting forth his views of the over-all classification of the Skippers of the world, with a discussion of the basis for his system. He wrote that he must first concentrate all of his efforts on completing the Catalogue. We were expecting the manuscript of the *News* paper when word of EVANS'S passing was received in the form of a letter written by EVANS and mailed at the time of his death. on instructions to his niece. It stated, in part: "In 1952 the Lepidopterists' Society paid me the great honor of appointing me an Honorary Life Member of the Society. In 1953 I observed that on the death of Professor G. D. HALE CARPENTER, who had received the same distinction, a very complete obituary was published in the *Lepidopterists' News*. In case the Society decides to follow the same course on my death, I enclose a photograph and a list of my publications." This considerate and orderly act allows us to present the following bibliography, with post-1955 additions by Dr. P. F. BELLINGER. The portrait was taken by KENT H. WILSON in 1952. —C. L. REMINGTON]

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FIELD NOTE

EUREMA NICIPPE (PIERIDÆ) BREEDING IN CONNECTICUT

Prior to 1955 the sole report of capture or observation of *Eurema nicippe* Cramer in Connecticut that has come to my attention was my own single male taken 24 September 1941 in Sharon Township, along the Housatonic River bank. Near noon, 3 September 1955, while visiting the magnificent wildflower gardens of a friend in Woodbury, Connecticut, I approached a small patch of Senna hardly a minute or two after the sun had very suddenly appeared, bright and warm. It was its first emergence of the day and its heat was immediately noticeable. Two days of heavy storm clouds were breaking up rapidly. I became aware of sudden activity before me, an awakening quite unexpected. Upon collecting my wits this resolved itself into five fluttering *E. nicippe* which, after demonstrating momentary interest in each other, promptly dispersed. A net was hastily procured and a single male ultimately captured a short distance away.

Two days later the locality was revisited. There was no activity on the Senna patch, but one butterfly was observed apparently ovipositing below the tops of the sparse but tall meadow grasses nearby. Examination showed that the field had been mowed some time earlier. Senna plants growing there had not regained stature as had the grasses. For reasons shortly to become apparent, I hesitate to speculate on the sex of this individual. Nevertheless, several eggs were recovered from the very points where the observation had indicated they would be found. The butterfly was lost from direct view from time to time on such occasions. Capture was then made for the purpose of inducing further oviposition in confinement. A short time later a male was taken. No eggs were subsequently obtained from the confined specimen.

A week later the locality was again visited. Another male was taken and several eggs and small larvæ procured from the plants. Between 27 September and 8 October six emergences took place from this material (a seventh died in pupa). These were all males. The specimen I had confined has subsequently been determined by C. L. REMINGTON as a male. Had I been more alert I would have realized this by its border markings. Some time during this interval I had taken Dr. REMINGTON to the spot, where he took two nearly full-grown larvæ. One of these yielded a parasite and the other — you've guessed it — a male.

Several somewhat more extensive patches of Senna had been located with much difficulty along the Housatonic River in northwestern Connecticut where the plant is reputed to be "not uncommon". In fact, the entire of one warm sunny day was spent searching this area. No evidence of *E. nicippe* could be found. No other patches of Senna were located in Woodbury.

In summary, a total of four flying males were taken, not including the one in 1941; eight more males were bred to maturity (including C. L. R.'s). Waiving consideration for the moment of those taken on the wing in the belief that the habits of the respective sexes or dates of emergence could be a consideration, there yet remains a significant mathematical ratio to be explained. Granted 8 equal opportunities for either sex, the chances of obtaining all males is 1 in 256, or all of one sex, 1 in 128. Besides, it is not entirely reasonable to neglect consideration of the flying individuals because they were taken at the larval food plant, not hilltops or mud puddles, and except perhaps for the first, after eggs were to be found on the plants. The genitalia of all specimens have been examined to be certain that an unusual female with broad, complete dark margins was not included.

There was no sign of the species in 1956, here or at the other stations for Senna that had been found. Apparently, the species did not survive the winter here.

I trust that I will not seriously be suspected of believing in a unisexual "race" of butterflies in Connecticut (12 males are involved, 8 collected in pre-imago stages) but nevertheless would like very much to hear from other members of the Society who might have observed noteworthy disproportion of the sexes in bred Lepidoptera.

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NOTES ON THE DIAPAUSE OF LEPIDOPTERA IN HOT ARID SUBTROPICAL CLIMATES

by E. P. Wiltshire

All univoltine (single-brooded), most bivoltine (double-brooded), and many multivoltine (more than two broods per year) Lepidoptera species in hot arid subtropical climates such as the Middle East perform a summer diapause (æstivation), as well as a winter diapause (hibernation) in localities with a cold winter. Most of these species do so as pupæ.

Two early articles of mine (Wiltshire, 1938, 1941a) gave details of the phenology of this diapause in univoltine species. In some bivoltine species, the two broods are vernal and autumnal, æstivation separating them; in others, the two generations are consecutive and the diapause combines æstivation and hibernation and appears in alternate generations. In some multivoltine species the first two broods are consecutive and are separated by æstivation from later, autumnal generations, of which there is sometimes only one.

These however are generalisations based on the noted season of flight of the wild adults. The example, well-known in Europe, of the univoltine genera *Xylena* and *Lithophane,* with adults appearing twice a year (in autumn and again in spring after hibernation and sexual maturation), is a warning against judging entirely from the noted season of flight. For twenty years therefore, in the Middle East, I have kept notes of the dates of breeding various species, in case these might correct wrong judgments about phenologies. The following results in two congeneric bivoltine species, bred *ex ovo,* though not revealing anything so deceptive as the appearance of *Xylena,* etc., are nevertheless of interest.

Caradrina zobeidah Boursin appears to be bivoltine, as the adult only comes to light in March-April and October in Bagdad. *Caradrina bodenheimeri* Draudt seems also to be bivoltine, as the adult is only taken wild in spring and again in autumn; it is widespread in hilly places in S.W. Asia, but the breeding was from a Shiraz (S.W. Iran) female.

Breeding these two species from ova laid by gen.I females produced a split emergence of gen.II, part in June and part in October. Both were bred indoors, at a lower temperature than that prevailing out of doors, and this may account for the earlier appearance of part of the second generation. In captivity therefore these bivoltine species appeared three times annually, but since no matings were obtained from the June adults it was impossible to say whether they were in fact partially trivoltine, *i.e.* with three annual generations. In both species the first generation consisted of larger specimens than the succeeding broods.

Similar behaviour has been noted in the Hadenid genera *Discestra* and *Cardepia* in the arid Middle East: ANDRES (1924, p.35) stated he had bred *Discestra trifolii* Rott. from April pupæ from larvæ found in the Fayoum, Egypt, imagines hatching in May and October; and breeding *Cardepia albipicta* Christ. at Ahwaz (S.W. Iran), where it is bivoltine in a wild state, flying in April and October, I found that in captivity the second generation emerged partially in May. Only in *Caradrina, Cardepia,* and *Discestra* do I know of this sort of occurrence, though I have bred many families for many years. There are, however, probably other groups in which it occurs. This phenology may be generic, just as contrasting phenologies characterise related groups.

The above results, excluding those of ANDRES, were *ex ovo* and the behaviour is that of offspring of single mothers. In the following cases, however, a similar phenology was observed in pupæ from larvæ that were collected wild; they were contemporary but not necessarily of a single parent.

Notodonta ziczac L. does not reach such hot arid localities as the foregoing but in N. Iran at 6000 ft. it inhabits a biotope with a long dry summer and performs both æstivation and hibernation. Breeding from it I observed a split similar to those mentioned above, occurring in gen.I pupæ though later in the year. At Derband near Tehran four young larvæ were found that had evidently hatched about 5 June; they pupated 27-30 June. Three adult moths hatched in late August, and one in April next year. The longer diapause of the later individual combined æstivation with hibernation, while even the shorter pupal period of the other three comprised a distinct æstivation of nearly two months. Breeders in temperate climes will be able to give many parallel instances of this "partial second brood."

Papilio machaon L. is a multivoltine species that appears five times annually and probably has three or four annual generations at Bagdad and Shiraz. The third generation adults here may appear, promptly without diapause, in June and July, or after a pupal diapause in September and October. This butterfly's phenology is however very complicated, and fuller details of its biology at Bagdad will be published separately. The phenological split in the third generation seems to be a parallel to that in the second generation of the bivoltine cases described above.

To conclude: in hot arid subtropical climates, in most species it is not possible to break the diapause by breeding experiments; still less is it broken in the wild state. But in a few species, not univoltine, a premature partial hatch of adults occurs in bred pupæ in midsummer of which there is usually no sign in the wild state. If we exclude multivoltine species such as *machaon,* the word "usually" can be omitted in the foregoing sentence. It is nevertheless possible that even in a wild state a few individuals may hatch prematurely in midsummer, though this has not been observed.

This phenological plasticity may well enable the species to adapt itself to climatic change: it would enable a species to spread to a region with a slightly different climate, or to survive on the spot if geological time brought climatic change.

In another article (Wiltshire, 1941b) I mentioned the peculiar two-broodedness of *bodenheimeri* and *arenaria* Hamps. (recte *albipicta*) and suggested it might have evolved comparatively recently from a multivoltine phenology, as an adaptation to aridity and heat. I still think this is probably the truth, and that a univoltine phenology is a further sep of irrevocable specialisation, in the same direction, due to similar environment.

One frequently reads suggestions that winter cold has caused the evolution of the diapause; writers in temperate climes are apt to forget the equally important role of arid heat.

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THE LARVA OF *HYPERÆSCHRA GEORGICA* (NOTODONTIDÆ)

by ALEXANDER B. KLOTS

Thrice during the last two years I have found at Putnam, Connecticut, on *Quercus* larvæ of a Notodontid which corresponded to nothing recorded in the literature. A larva found in August, 1955 pupated but died during the winter; another found in July, 1956 was parasitized; but the third, also found in July, 1956, transformed the same year to the adult. This proved to be *Hyperæschra georgica* (Herrich-Schaeffer). These larvæ were nothing like the description of the larva of *georgica* given by FORBES (1948, p.220). FORBES, however, took his information from PACKARD (1895, p. 153), the only available source; and PACKARD merely quoted a MS of RILEY'S based on southern larvæ. The following description therefore corrects a mixup of long standing. It is doubly important to do so since it will bear importantly on the question whether *georgica* really belongs in *Hyperæschra.*

Length of mature larva 45 mm. Color very light gray green, almost whitish dorsally, deepening and darkening to olive green just above the immediately subspiracular lateral line, below that olive green. Lateral line yellow, slightly brighter on head; on body fading dorsally to whitish, finely edged both ventrally and dorsally with dark, the ventral edging reddish and the dorsal edging blackish; continuous from outer edge of mandible and antenna, below stemmata, almost to posterior (median) end of anal plate where it fades out.

Head light gray-blue-green, reticulated with darker and lighter shades of the same hue; edges of epicranial suture lighter; stemmata black. Thoracic segments lighter than those of abdomen. Body with a pair of narrow, indistinct, whitish subdorsal lines very close together. Laterad of these, on each segment, 3 small whitish warts, longitudinally arranged; laterad of these an irregular, longitudinal line of 8-11 small whitish dots; laterad of these a similar, irregular longitudinal line of 7-9 small whitish dots; laterad of these the line of the spiracles and the longitudinal line. Spiracles oval, whitish, narrowly rimmed with black. Ventrad of lateral line a number of small whitish tubercles and dots. On each of abdominal segments 1-8 a short, dark, somewhat indistinct longitudinal line in a narrow groove.

Head held more at a right angle to body axis than parallel to it (as in *Gluphisia*), but not as pronouncedly at a right angle as in *Nadata gibbosa* (J. E. Smith). Skin very smooth and waxy looking, but definitely not shiny as in larva of *Pheosia rimosa* Packard. Setæ and hairs very fine and short, whitish. No enlarged warts except a pair of small ones on dorsum of abdominal segment 8 which nearly touch mid-dorsally; these are bright orange and surrounded by a narrow, slightly irregular, bright yellow area. Anal prolegs definitely smaller than the others, but fully used and not carried up in the air.

Described from a larva found at Putnam on *Quercus rubra* L. when fully grown. This larva entered the soil to pupate on 18 July 1956; the adult emerged on 1 or 2 August 1956. The larval and pupal exuviæ and the adult are in the collection of the American Museum of Natural History. This and the other two larvæ, which were also on *Q. rubra,* fed chiefly along the midribs of mature leaves, progressively eating away one side of the leaf outward from the base. They fed and rested along the midrib with their dorsal surfaces down. In this position they were not easily discerned even when in plain sight, largely due to their reversed countershading.

In FORBES' key (*loc. cit.,* p. 209) this larva would probably run to couplet 9, since its markings other than the lateral stripe are inconspicuous. In couplet 10, however, it would agree with neither of the alternatives. In any event it would not run to the Riley-Packard *Hyperæschra.*

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EUREMA DAIRA DAIRA IN MISSISSIPPI

by BRYANT MATHER

The name, *Eurema daira daira* Latreille, is used here, as it was by KLOTS (1951), to include the material previously referred to as two species: *E. jucunda* Boisduval & Leconte and *E. delia* Cramer (= *E. daira*), following his view that "there is little doubt that "jucunda" is the summer form and "daira" the winter one of a single species."

Both published lists of Mississippi butterflies included *E. jucunda.* WEED (1894) commented that it is rarer than *lisa* or *nicippe;* HUTCHINS (1933) listed it as common in late summer. Neither list mentioned *E. daira* or *E. delia.*

HOLLAND (1931) stated that both *E. jucunda* and *E. delia* are found in the "Gulf States." KLOTS (1951) gave the range of *E. daira daira* as "Florida n. to North Carolina w. to Mississippi, Arkansas, Louisiana, and Texas." In his 1948 paper he said that northern records were needed both in the eastern coastal plain and the interior. KLOTS (1951) reported that in Winter Park, Florida, he found "jucunda" regularly throughout the summer; then, in September, it became very scarce, and in October "daira" appeared and flew nearly throughout the winter. Occasional intermediate forms occurred, mostly in the fall and spring broods. GROSSBECK (1917) gave Florida records for "daira" (*"delia"*) in September, October, and January; and for "jucunda" in May, September, and October. HARRIS (1950) gave Georgia records for "daira" (*"delia"*) in late summer and fall, especially September and October, and also April; for "jucunda" all summer, most abundant from mid-July to mid-September. LAMBREMONT (1954) reported 26 specimens (15 ♂♂, 11 ♀♀) from Louisiana; all but three taken between 6 and 8 September 1950, the others on 5 June 1950 and 25 September 1936. He noted that the species had not previously been recorded from Louisiana but did not indicate which forms were represented.

From these accounts it might be expected that, under favorable conditions, forms of *E. daira daira* could be taken in Mississippi in every month of the year, form "jucunda" appearing in the late spring and continuing until fall, form "daira" appearing in the late summer and cintinuing into the spring, with intermediate forms appearing principally in spring and fall. Except for KLOT'S report of his observations at Winter Park, Florida, the reports from any one state include only scattered records through the year.

I have taken specimens at 27 localities throughout the state of Mississippi, from the Gulf Coast to the Tennessee border, thus representing a north-south cross section of most of the range of the species in this region. These specimens were taken in every month except December and January. The summer form "jucunda" has been taken from 7 April to 13 October; intermediate forms "delioides" from 28 September to 25 October; and the winter form "daira" from 16 September to 21 March. Two or all three forms have been taken flying together on nine different occasions from mid-September to mid-October, in five different years, at widely separated localities in the state including Biloxi (23 Sep. 51) and Ocean Springs (3 Oct. 53) on the Gulf Coast, Waynesboro (19 Sep. 53) in the southeast, Hattiesburg (16 Sep. 55) in the south central, Clinton (1 Oct. 50 and 5 Oct. 52) central, and Plymouth Bluff (13 Oct. 50) in the north. These data tend to confirm the expectation that further collecting should yield "daira" in January (as was found by GROSSBECK in Florida) and evidence of a "daira"-"jucunda" overlap in March - April (as is suggested by HARRIS'S report of April "daira" in Georgia.) The transition from "daira" to "jucunda" and vice versa in Mississippi seems to occur during the period in which the average temperature is changing from greater than to less than the mean annual (65°F.) or vice versa. This tends to agree with KLOTS'S (1948) comment on the work of HASKIN: "strongly suggests the likelihood of "jucunda" being a hot-season form and "daira" a cold-season form of the same species."

The underside of the hindwing of the summer form "jucunda" is white; that of the winter form "daira" is tan to reddish. Males of all forms have clearly defined broad black bars along the inner margin of the forewing above. Females of "daira" entirely lack this black bar and those of "jucunda" either lack it entirely or have it poorly defined. Both sexes of "daira" have a short dark border along the hindwing above; in "jucunda" this border is longer. Intermediate forms "delioides" have intermediate characteristics, the most apparent of which is that the underside of the hindwings is typically whitish flecked with tan.

The forewing lengths of 91 Mississippi specimens were measured and the distribution of results is given below:

forewing length, mm.	"daira"		"delioides"		"jucunda"		total
	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	
14	..	..	.	..	2	.	2
15	.	.	2	.	11	2	15
16	4	1	1	1	8	5	20
17	10	9	..	1	6	8	34
18	2	11	..	..	2	2	17
19	1	2	..	..	..	..	3
total no.:	17	23	3	2	29	17	91
average, mm.	17.0	17.6	15.3	16.5	15.9	16.6	16.6
range, mm.	16-19		15-17		14-18		14-19

Holland (1931) indicated that "jucunda" is appreciably larger than "daira" and that there is no overlap in size. The data given above indicate the reverse. Since these data are derived from specimens representing successive seasonal manifestations of a single population, the relationships suggested by them are regarded as probably more accurate.

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ON THE SUBSPECIES CONCEPT IN TAXONOMY

by SERGIUS G. KIRIAKOFF

Referring to the discussion by VAN SON (1955) and FORBES (1956), I should like to add a few words on certain aspects of the subspecies problem.

First of all, it cannot be enough emphasized that there are several kinds of subspecies, not to speak of the taxon called *semispecies* that occupies, in a two-dimensional hierarchical scheme, an intermediate position between the subspecies and the species. Readers of the *News* may remember that I gave several years ago (Kiriakoff, 1948 a-c) a short review of the taxonomical aspect of the specific complex, with a scheme based for a great part on suggestions by J. S. HUXLEY. Circumstances prevented me from presenting my scheme to the Copenhagen entomological congress which I intended to do although fully aware of the very few chances of its being accepted. Too many people still are typologically minded, and the new phylogenetical spirit is only beginning to show itself, even in West Europe. All the same, I should like to emphasize once more that there is not much sense in applying the same taxonomical treatment to geographical, ecological, and cytological races and to semispecies. That applies, on a higher level, to full species and to ultraspecies *sensu* KIRIAKOFF (1948c) and SCHINDLER (1952), not MAYR, *et al.* (superspecies, 1953 *e.g.*).

Professor FORBES is basically right when speaking of the difficulties in connection with the size of the various taxa. The difficulty lies not alone with the prevailing typological thought: even those who believe in the phylogenetical postulate of the objective reality of the taxa, are aware that in practice most of the groups we are using are "purely arbitrary" as FORBES says, at least in respect to their size. That, however, in no way affects the principle referred to.

Regarding FORBES'S suggestion 1 (*l.c.*: 36), it would seem very satisfactory should there exist the geographical subspecies alone. If we consider *e.g.* the races of endoparasitic organisms, we find it rather awkward to describe "blocks of material"; shifts of "type localities" suggested by FORBES would face the same difficulty. To have done with FORBES'S suggestions, I should like to add that I quite agree in principle with his last one, because in my paper referred to above, and in several other publications, I had suggested various symbols interpolated between the allotaxonic names of a form.

Before treating the last and most important point of the whole matter, I should like to turn again for a moment to the various kinds of "subspecies". Most people still consider the geographical moment as the "true diagnostical character" of a subspecies, I believe under the influence of Dr. MAYR, although I find the opinion of that leading authority to be somewhat less rigid in his 1953 book than in his previous works. I believe one of the reasons of this general attitude is a confusion between the "geographical" and "chorological" concepts; the latter is much broader as it includes every aspect of the spatial factor. Perhaps, a better understanding could be reached by using the term "chorological" instead of "geographical" race. That would include *e.g.* the whole host of endo- and exoparasites in the concept, and would permit avoiding the nonsense of treating *e.g.* the races of intestinal parasites as "geographical subspecies".

The important point referred to above concerns the International Commission's definition of the subspecies. It is quite irrelevant that the definition itself may be a good or a bad one. The "real issue", to use HUXLEY'S phrase (in quite another case), is the fact that a commission entrusted with work on nomenclature has seen fit to give the definition of a taxon. I must admit that, as far as I am aware, most people seem to find such proceedings quite natural and eventually only discuss the wordings of the definition. I find it amazing that nobody has ever realized the danger of such proceedings, as a precedent. In my recent handbook on Systematic Zoology (1956: 120) I have pointed out the arbitrariness of the Commission's doings. Here is the translation of what I wrote: "In this case the Commission has conspicuously transgressed the boundaries of its rights and of its competence: its task consists in finding purely formal reglementations for nomenclatorial questions; definitions of taxa should be left to taxonomists whose dealings are under their own responsibility; the International Commission has no right whatsoever to cover with its authority purely scientific definitions". I believe the last point is the most important because literature shows very distinctly most people take the Commission's definition as something "formal" or even "binding". That it cannot be, and moreover the doings of the Commission have a dictatorial air that no taxonomist should tolerate. Nomenclatorial decisions should be accepted by everybody, even against one's better judgement; but a line must be drawn somewhere, and in the present case the doings of the Commission are definitely beyond that line. The authors of the definition probably are better zoologists than I am, but on that occasion they were very conspicuously trespassing, and one feels justified to call out: *"Sutor nec supra crepidam!"*

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J. A. ALLEN'S TRIP TO COLLECT IN COLORADO, ETC., IN 1871

by F. MARTIN BROWN

While preparing the manuscript for Part III of *Colorado Butterflies* (Brown, 1955). I found it necessary to do a little research into ALLEN'S trip to Colorado. EDWARDS (1873) had stated in his description of *Thecla crysalus* that ALLEN collected types at Lake Pass in Colorado. Since there is no Lake Pass in Colorado where *crysalus* might be found, the problem was to determine what pass ALLEN had so named. The solution to the problem was found in ALLEN'S (1872) report upon his trip. Since SCUDDER, and probably others, have described material brought back to the Museum of Comparative Zoology by this expedition, it may be of assistance to have available the details of travel, especially in Colorado where the terrain is so variable. The following is pieced together from ALLEN'S sketchy review of the trip and the data in a systematic account of the birds he collected.

"The expedition commenced its work at the Missouri River in the vicinity of Fort Leavenworth, [May 2-11, 1871, ALLEN, *l.c.*, p. 122*] and collected at intervals thence westward to the Great Salt Lake Valley. Mr. RICHARD BLISS, JR., of the Museum, accompanied the expedition as ichthyologist; and Mr. C. W. BENNETT of Springfield, Massachusetts, as taxidermist." (p. 113)

From Fort Leavenworth the party moved by rail to Topeka, Kansas, where they spent the time between May 11 and 24 (p.122) collecting in the area. On the 25th they moved to Fort Hayes in central Kansas and collected there for about a week (May 26 — July 3, p.131.). The next move, again by rail, was to Denver, Colorado Territory, where they arrived on July 4th and stayed until the 8th. At Denver, the head of rail in 1871, the party organized for its work in the mountains. They travelled by wagon in a circular route to South Park and Colorado City and back to Denver.

Like MEAD in 1871 (BROWN, 1956: p.186) they entered the mountains via Turkey Creek and probably spent their first night, that of the 9th-10th, at Junction House on the stage road to Fairplay. For the next few days they proceeded through the rolling pine-clad hills to the South Platte River at Bailey's Ranch, thence along the north bank of the river to Kenosha Pass. From Kenosha Pass they dropped down into the sweeping grasslands of South Park. On the 14th of July they were in camp on Jefferson Creek (p.156) at the west foot of the pass. The exact dates of arrival and departure of the party from Jefferson Creek is not known. They may have arrived as early as the 12th and could have stayed until the morning of the 18th. The next dated locality is Fairplay where the party arrived July 18th (p.158).

The next eight days were spent in the glacial meadows and spruce-forested slopes of the Platte valley between Fairplay and Hoosier Pass. Apparently the members of the party moved about extensively in this area. On p.158 there is a note "July 18 to 23, at Fairplay" and on the following page "a week spent in the vicinity of Montgomery." Since the party was at Montgomery on the 24th (p.164) and at Hamilton, a full day's journey away on the 28th (p.159), they must have left Montgomery at the latest on the 27th. This does not allow a week from the last date at Fairplay. The quandry can be resolved if we consider that the party divided at Fairplay to better make use of their limited time in the region. Thus one of the party probably stayed at Fairplay from the 18th to the 23rd while the others moved on to Montgomery on the 19th or 20th. Montgomery is a small mining town, still in existence, in the mouth of Platte Gulch. It lies in a deep glacial valley between the sheer north wall of Mount Lincoln and the great rounded ridge that extends westward from Hoosier Pass. The valley floor before it is grassy with a multitude of beaver dams and swamps along the Platte river. Above the grassland is a narrow fringe of alpine forest that soon gives way to the wind-swept barrens above the timber line. Back of Montgomery, up Platte Gulch there is little more than a gallery of willows along the stream and a few hardy alpine conifers scattered on the flanks of the valley. The South Branch of the South Platte has its source in the snow banks at the head of this valley. While here "one excursion was made to the top of Mount Lincoln" (p.160), where there are "snow fields above timber line" (p.161). Other trips were taken up Platte Gulch and into meadows in the other direction.

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*Hereafter where solely a page reference is given it refers to this article by ALLEN.

Next the party turned its back to the "Snowy Range." This must not be confused with the Snowy Range of today that lies west of Laramie, Wyoming. It is a name applied during the '70's to what we now call the Park Range, which extends from Mount Evans in the Front Range to Mount Lincoln. The trail led back to Jefferson in the northeast corner of South Park and to Hamilton, long since gone. On "July 28th [they were] on the Platte, near the eastern edge of the Park" and visited the brackish lakes near Hamilton (p. 159). By the first of August they had travelled along the Tarryall River, reached Florissant, crossed Hayden's Divide (now simply called Divide) and descended from the mountains via Ute Pass to camp outside of Colorado City near the Garden of the Gods (p. 147). Colorado City now is part of the western section of Colorado Springs that lies across Monument Creek from the center of the city. There they stayed for four days (p.147). While at this camp the party visited Soda Springs, now within the city of Manitou Springs at the mouth of Ute Pass, and collected along the banks of Fontaine-qui-bouit (*sic*), today called Fountain Creek.

When the camp at the Garden of the Gods was broken the group slowly moved northward to Denver. The first night out was spent on Kettle Creek where it joins Monument Creek. The next day, July 5, they worked their way up Monument Creek with oak chapparal to the west and grasslands to the east to "Summitt Lake (Lake Pass)" (p.152). This placed their camp at what is now called Palmer Lake. Here the east-west ridge of arkose that divides the Arkansas and Platte watersheds joins with the north-south trending Rampart Range. On the ridge the slopes are clothed with a stiff thicket of scrub oak and a few scattered pines; a few hundred feet to the west on the slopes of the Rampart Range the cover is pine and spruce. Two full days were spent at the lake (p.147). They arrived on the evening of the 5th (p.152) and probably left early in the morning on the 8th. On the 7th (EDWARDS, *l.c.*: p.345) the types of *crysalus** were taken. Then they went northward along Plum Creek to its junction with the South Platte (p.147).

The problem is which Plum Creek, East or West? I have a strong feeling, but that is all, that ALLEN travelled down West Plum Creek. This is essentially the same route, but in the reverse direction, that was followed by THOMAS SAY on the Long Expedition. The proponents of the East Plum Creek route base their contention on the fact that the town of Castle Rock lies on East Plum Creek and both parties mention Castle Rock. JAMES (1823), in his account of LONG'S Expedition, of which he was botanist, clearly described as "Castle Rocks" what today is known as Dawson Butte. ALLEN (p.151) refers to "Castle Rocks." The present day Castle Rock is singularly single whereas Dawson Butte is rimmed with several castellated formations in the arkose. ALLEN'S route took him past "Blake's Mill on Plum Creek" (p.151) and once it is fixed where Blake's Mill once stood the puzzle of West or East Plum Creek will be settled for ALLEN'S itinerary. From Castle Rocks (Dawson Butte ?) the trail of the expedition led to "Bear Creek, about 15 miles southwest of Denver, behind the first foot hills" (p.147), Dry Creek, 10 miles south of Denver, and finally the small town of Denver.

The expedition reached Denver for the second time on August 13th (p.147) and left for the north by rail on the 16th (?), arriving at Cheyenne, Wyoming, the same day. There they spent several days, August 16th to 28th (p.144) and collected in a radius of about 20 miles having visited Crow Creek, about that distance from Cheyenne. During the last days of the month they collected on the "Laramie plains" (p.182). Early in September the party reached Great Salt Lake in Utah. From then until the 8th of October they were in the Salt Lake - Ogden, Utah, area. (p.164) While there they visited and collected specimens around the lake, along Weber River and in Ogden Canyon, climbing "half way up the mountain" near Ogden on the 7th of October (p.169). From the 1st of September onward it is difficult or impossible to assign specific dates and localities to the wandering scientists. Someone with time on his hands and access to the bird skins at the Museum of Comparative Zoology could build a time table from the data tags on the skins. I am 2000 miles from that museum or I would have done so.

ALLEN and his party headed home on the 8th of October. This they did in a leisurely fashion. During October collections were made at Green River, Wyoming, (pp.174-5) and Fort Steele, Wyoming (p.179), about 5 miles west of the present town of Wolcott in Carbon County. The old Fort was on the west bank of the North Platte River. Apparently they spent several weeks in this region for on p.177 there is a record of *Leucosticte tephrocotis* Swainson, one of the Rosy Finches, taken in Carbon County in December. Probably it was at this time the party visited the Medicine Bow Mountains (p.178) that lie some miles south and easterly from Wolcott. By December 25th the expedition was back in Kansas where for "a period of nearly three weeks, [they] made . . . a wagon journey of over two hundred and fifty miles.

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*Some may consider the date too late for *crysalus*. I have collected the species at even higher altitude as late as August 30th (BROWN, 1955: p.125).

The area traversed was nearly fifty miles square, extending westward from Park's Fort Station on the Kansas Pacific Railway, to Grinnell, and from the Smoky River on the south to the headwaters of the Solomon on the north." (December 25, 1871, to January 12, 1872, p.142) The area covered by this reconnaissance today lies in the four central-western counties, Graham, Sheriden, Grove and Trego. This trip closed the field season and the party returned to Boston.

The map I drew to accompany my account of MEAD'S travels (BROWN, 1956: p.187) will serve for ALLEN'S route from Denver to Fairplay. The jog in the track just southwest of the symbol for Kenosha Pass is where the road crosses Jefferson Creek, ALLEN'S camp site. The route of the party from Fairplay to Colorado City is today these auto roads: Fairplay to Jefferson, US 285; Jefferson to Lake George, Colo. 77; Lake George to Colorado Springs, US 24. The present auto route from Colorado Springs to Denver lies east of ALLEN'S route. State and County tertiary roads follow it more closely.

A condensed time table from the data I have at hand which can be greatly enhanced with data on the bird skins at the M. C. Z. follows:

May 2 - 11	Fort Leavenworth, Kans.
May 11 - 24	Topeka, Kans.
May 26 - July 3	Fort Hayes, Kans.
July 4 - 8	Denver, Colo.
July [9]	Turkey Creek, Jefferson Co., Colo.
July 14	Jefferson Creek, Park Co.; Colo.
July 18 - 23	Fairplay, Colo.
July 19 - 24 - [27]	Montgomery, Colo.
July 28	nr. Hamilton, Colo.
August 1 - 4	Colorado City, Colo.
August 4	Kettle Creek, El Paso Co., Colo.
August 5 - 7	Lake Pass (Palmer Lake), Colo.
August 13 - 16	Denver, Colo.
August 16 - 28	vicinity of Cheyenne, Wyo.
August [30]	Laramie plains, Wyo.
September [1] - October 8	vic. of Ogden, Utah.
October ? - ?	Green River, Wyo.
October ? - December ?	Fort Fred Steele, Carbon Co., Wyo.
December 25 - January 12	central west Kansas.

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ADDITIONS AND CORRECTIONS TO "A BIBLIOGRAPHY OF GENERAL CATALOGUES AND CHECK LISTS OF NEARCTIC RHOPALOCERA"

by CYRIL F. DOS PASSOS

Because of the complexity of the original manuscript of this bibliography (*Lepid. News* 10: 29-34; 1956) and the many errors in the first galley proof resulting from the difficulty involved in setting the type, the author requested and expected to see a second galley proof, so as to check all corrections and introduce some new matters that were daily expected in answer to several outstanding inquiries. Unfortunately a second galley proof is not usual practice, and in this instance it was impossible because of a time limitation. The following additional references should be added to the bibliography:

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Yokoyama, Mitsuo (revised by Teiso Esaki), 1955. *Coloured illustrations of the butterflies of Japan* [in Japanese]. Osaka, Japan. [10] + 136 + [2] pp., frontispiece (colored), 63 pls. (colored). (Professor ESAKI has kindly advised the author that there were two prior printings of this work, *i.e.,* on 5 June 1954 and on 20 July 1954, each without the English title. Delete Esaki, 1955 entry in bibliography [1956].)

The following corrections should be made to the bibliography:

p. 30, line 22: "American" should be "America".
p. 31, line 27: "1871" should be "1861".
p. 31, line 30: "Lepidoptterorum" should be "Lepidopterorum".
p. 31, line 33: insert a comma after "I".
p. 31, line 46: "1866" should be "1868".
p. 33, line 25: "Forster" should be "Foster".
p. 33, line 27: "th" should be "the".
p. 33, line 35: insert a comma after "46".
p. 33, line 49: insert a period after "Acad".
p. 34, line 5: after "2:" insert "pp.".
p. 34, line 8: "Charaxiidinæ" should be "Charaxidinæ".

Washington Corners, Mendham, N. J., U. S. A.

ESPECIALLY FOR COLLECTORS

(Under the supervision of JAMES R. MERRITT)

LEPIDOPTERA COLLECTING IN THE ATLAS MOUNTAINS OF MOROCCO

by COLIN WYATT

The Atlas Mountains of Morocco consist of three parallel ranges running WSW-ENE — the Middle Atlas in the north, some 200 miles long, which is mostly forested and has a predominantly Mediterranean fauna and flora except on part of its southeastern slopes, the High Atlas which runs eastwards from the Atlantic Ocean for some 500 miles in three main sections separated by two 8,000 ft. passes, which is alpine in character with its own rather special fauna and flora, and the Anti-Atlas to the southwest, which is predominantly desertic in character and is very poor in fauna and flora.

The Middle Atlas has an average height of about 5,500 feet, rising to peaks of 7,500 ft. or so, while the High Atlas averages around 10-12,000 ft. with peaks of over 14,000 ft. having a heavy snowfall in winter. The highest area is the Toubkal massif which has several peaks of over 14,000 ft., then follows the m'Goun massif in the centre, also rising over 14,000 ft., and finally the Ayachi massif to the east which only rises to about 12,500 ft. The Anti-Atlas rarely has snow on it, and then only on its highest peak, the 10,500 ft. Siroua.

The High Atlas forms an almost impenetrable barrier between the Mediterranean climate, fauna, and flora to the north, and the desert to the south whose flora and fauna show certain affinities to the purely African type. Entomologically the Middle and High Atlas ranges are the most interesting, and these I covered thoroughly from March to late May in 1949, and from April to August in 1950.

The first butterflies to appear are lycænids and pierids, the earliest being *Thestor mauretanicus* in late February in the foothills up to 5,000 ft. In the plains *Pararge ægeria* appears early in March, and shortly after it the distinctively N. African yellow pierid *Euchloe charlonia,* which is abundant everywhere. I once even found a female dead in the snow in March at 12,500 ft. in the m'Goun range. With it appears *Anthocaris belemia,* which otherwise only flies in southern Spain. Most of the northern Moroccan butterflies show close affinities with those of Spain, such as *Zerynthia rumina, A. belemia, Zegris eupheme, Euphydryas desfontanei, Melitæa ætherie, Satyrus prieuri,* but there is also a small minority which have their nearest relatives in the Middle East, such as *Euchloe charlonia, Satyrus atlantis* (once regarded as a race of *S. mniszechii*), *Philotes bavius fatma,* and the species of *Cigaritis* and *Apharitis. Z. eupheme* is really a Middle East species that presumably found its way into Spain via North Africa in some dim distant age when a land bridge existed. These many extraordinary relationships between Spain on the one hand and the Middle East on the other make one wonder which way the traffic was going — perhaps both ways.

Finally there are the purely African species such as *Teracolus nouna, Powellia adenensis doris, Parnara zelleri,* and the specialties of the Atlas, *Anthocaris falloui, Satyrus abdelkader, S. atlantis, S. colombati, S. hansii, Cœnonympha vaucheri, C. fettigii, Epinephele maroccana, Argynnis lyauteyi, Chrysophanus phœbus* (really a plains species but occurring close to the foothills), *Philotes vogelii, Polyommatus allardi, P. martini, Lysandra atlanticus, Sloperia mohammed, Adopæa hamza.*

But one is constantly reminded of the Mediterranean, especially in the Middle Atlas. Here, in the Ifrane district, the predominant butterflies in spring are Z. *rumina, E. eupheno, Callophrys rubi,* and C. *avis,* and hibernated *Polygonia c-album* and *Eugonia polychloros.* Many well-known central and northern European species fly everywhere later on, even into the High Atlas valleys, such as *Papilio machaon, P. podalirius, Satyrus statilinus, S. alcyone, S. briseis, Euphydryas aurinia, Melitæa phœbe, M. didyma, Zephyrus quercus, Polyommatus icarus, P. bellargus,* and many others. Five of these cross right over the High Atlas and come down into the barren Anti-Atlas and far into the desert oases: *P. machaon, Pontia daplidice, M. didyma, P. icarus, C. phlæas.*

I will now try to take each group of mountains separately. The richest by far is the Middle Atlas. This is an ancient volcanic range, and the cones of old craters, mostly crowned with groves of cedars, dot its 6,000 ft. plateau. On the northern slopes lie great forests of Cedars and *Ilex,* together with areas of Pines and Oaks, forming a wonderful parkland whose flower-spangled glades are alive with insects. In the spring Paeonies and Saxifrages flower everywhere, the lush valleys by the creeks are fringed with Poplars and Ash and Hawthorn, and only the occasional *Macacus* monkey and the howling of the jackals at night remind one that he is in Africa after all. The native population are Berbers, peaceful farmers and small herdsmen. There are several excellent north-south French paved roads, and a selection of rough dirt tracks run off them into the wilder areas, but most are quite practicable for an automobile with a good ground clearance. I took a small car and a tent, camping out for the entire collecting season. I would buy my bread, butter, and eggs from the Berbers, and stock up with canned goods whenever I was near a village or township boasting a general store. Very often I had to carry my own water in two 2-gallon cans. Never once was I molested in any way, and I would leave my camp for hours on end, car and all.

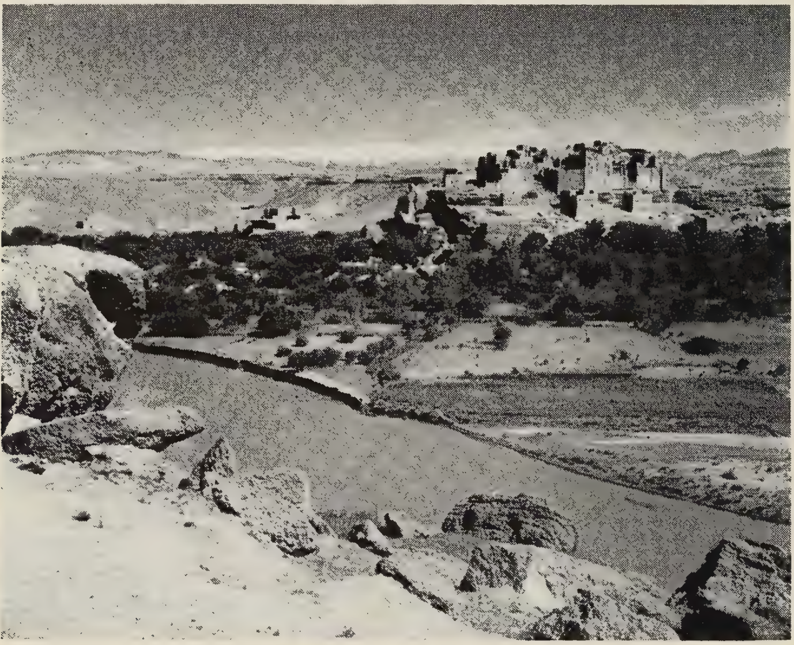

Fig. 1. The village of El Kelâa m'Gouna, on the edge of the Sahara, with the 13,000 ft. m'Goun Range to the north. Typical of the southern (desert) slope of the range.

Along the southern edge of the main plateau, which is some 20-30 miles wide, lies a narrow transition belt between the Mediterranean and desert faunas, and its southern slopes, which fall into the wide and arid Moulouya valley, just north of the Ayachi massif of the High Atlas, are strongly desertic in character. Here in many places transitional forms of the butterflies appear, individuals in the same populations being now close to the Mediterannean form, now to the desert one. A case in point is *Melitæa didyma,* which at Ifrane is the large, bright, and strongly marked *mauretanica.* In the Moulouya Valley and south of the Ayachi flies the very small, pale, lightly spotted *deserticola.* But on the Taghzeft Pass, leading from the main plateau into the Moulouya Valley, flies an intermediate population of which about 60% are *occasus,* but 40% closer to *mauretanica.* At Ifrane and elsewhere on the plateau flies the uniformly dark *Satyrus abdelkader lambessanus,* while in the Moulouya Valley flies a race very close to the Algerian *nelvai,* with wide white borders to the wings; on the pass flies a distinct race, *taghzefti* Wyatt, which shows mostly narrowish yellow-white borders to the wings, but of which some females and an occasional male are very close to *nelvai*, say 10%, while about 4% are all dark as in *lambessanus*. In the High Atlas the great chain of peaks forms an impassable barrier to all but the strongest fliers or the notoriously migratory species, so no intermediate forms exist—there the *S. abdelkader* are all *lambessanus,* while the *M. didyma* are a separate race but closer to *mauretanica.*

The most interesting butterfly of the Middle Atlas is undoubtedly *Philotes vogelii* Obth. First discovered by HAROLD POWELL, who for many years collected very extensively in North Africa for OBERTHÜR. It is only known from three localities all within ten to twenty miles of each other. Even in these it is restricted to an area of some five acres in extent, where its equally rare foodplant, *Erodium cheilanthifolium,* grows. It flies in mid-August, very low over the stony ground. While very different in appearance, its habits, as also its foodplant and habitat are very similar to those of the almost equally localised *Plebeius ramburi* (*idas*) of Spain. The larvæ are attended by a very small black ant and hide by day down near the roots. I was lucky enough to find four in July from which I finally bred one fine female on August 11. It is a very distinctive insect, unlike any other lycænid I know, and is almost unknown in collections. Next in interest comes the very lovely *Philotes bavius fatma,* of which the nymotypical form comes from the Near East, with another form in Hungary in Europe. This is much more plentiful but also very local, only flying in grassy areas near the edge of the cedar forests where its foodplant, a giant, wooly-leaved *Salvia,* grows. The larvæ feed by day in the flowerheads and are easy to rear; the pupæ will often overwinter twice. Another fine "blue" is *Polyommatus martini,* which also flies in Algeria, in the Aurès Mts. Then comes a fine hesperiid, *Sloperia mohammed,* which is very local and few in numbers, flying in forest clearings where its foodplant grows. I never saw it on the wing but bred a fine series from larvæ taken in mid-June. These spin a sort of light cocoon in a fold of a leaf in which they aestivate through the hot month of July, taking no food until early August when they feed up rapidly and pupate, emerging in late August and September. Its spring generation "caid" flies in May. The finest of all Middle Atlas butterflies is *Argynnis* (*Mesoacidalia*) *lyauteyi* Obth., a magnificent species which some authors regard as a subspecies of *M. charlotta* (*aglaia*). However, *lyauteyi* only flies in the Ifrane area of the Middle Atlas, and as there are no other subspecies of either it or *charlotta* anywhere in N. Africa, I am not entirely convinced of this. Its congener (for I am not a generic hair-splitter) *Argynnis auresiana,* which flies elsewhere in Morocco and Algeria, is probably more rightly regarded as a subspecies of the European *A. niobe.* Another fine species is the giant, bat-like satyr *S. abdelkader,* which frequents steep, dry hillsides where the Esparto grass grows, the males sailing up and down over the tall tussocks in search of the females. It is a very hard species to catch, for while it appears to be gliding slowly it is extremely wary, and the "blast" of wind at the stroke of the net seems to catch its wide wings and waft it suddenly away at the last moment.

The almost world-wide species *Papilio machaon* first appears in the northern plains in the huge form *maxima,* flying up into the cedar forests by Ifrane. In the plains it feeds on Fennel, but at Ifrane and in the desert on Rue. In the desert foothills and the Sahara oases flies the small, pale form *saharæ,* but again, on the Taghzeft Pass and probably other similar areas flies a more intermediate form with pale wings and narrow tails which is similar to *saharæ* but larger and brighter. *Zerynthia rumina africana* flies at Ifrane in plenty in early May, and about 10% of the females are the strikingly handsome deep orange dimorphic form "canteneri." *Papilio podalirius* feeding on *Prunus* and peach-trees, flies in the spring form "maura," and appears in summer in the superb long-tailed form "latteri."

The Moroccan specialty *Cœnonympha vaucheri,* the handsomest species of the genus, flies generally throughout the Middle Atlas, though often locally, in the pale form "annoceuri" Wyatt. It is plentiful at Annoceur and on the Taghzeft Pass, coming to feed on Sage and Thyme. *C. arcanioides* flies with it at Annoceur, and *C. fettigii,* a good species which some authors have tried to unite with the Spanish and S. French *C. dorus,* just overlaps with the last of *vaucheri* on the Taghzeft Pass.

Four other very local species of interest are *Anthocaris tagis mauretanica,* very scarce and local, *Pieris manni haroldi* Wyatt of which only 10 specimens are known apart from my series, also extremely local, *Lysandra atlanticus* Elwes, a very lovely "blue" closely allied to both *L. dorylas* and *L. albicans,* and the race *berber* of the latter species. All are closely related to Spanish forms.

Satyrus atlantis occurs locally but abundantly in the area in the pale race *colini* Wyatt; its nearest congener is *S. mniszechii* from the Middle East. The Spanish *S. prieuri* occurs very locally and only in isolated individuals in the large form *kebira* Wyatt; it is very hard to catch among the stones. The yellow form of the female, "uhagonis," is so far unknown from N. Africa.

The High Atlas also has several peculiar and distinctive species. It is a hard and barren landscape of high peaks and deep valleys. This is the home of nymotypical *C. vaucheri, S. atlantis, Melanargia ines jahandiezi,* and *E. maroccana.* The four most distinctive insects are *Pieris napi segonzaci, Satyrus arethusa aksouali* Wyatt of which only three specimens were known until 1950 and the only locality in N. Africa where it occurs, the fine large race *herakleana* of *Chrysophanus alciphron,* and *Polyommatus allardi,* of which the race *ungemachi* flies in the m'Goun massif in late April concurrently with *Glaucopsyche melanops alluaudi.* In the High Atlas the flora is more desertic in character, especially prominent being the round spiny cushions of the Leguminosæ. It is altogether a rougher and more severe landscape than the Middle Atlas, the only trees being a few scattered stands of *Ilex* and Thuriferous Juniper deep down in the valleys, and of course the walnuts planted around the villages. The only abundant vegetation is alongside the creeks and deep river valleys, and on the edges of the network of aqueducts which terrace along the hillsides near all the villages, by which the peasants irrigate their terraced crops of corn and rye. These mountains are the home of the Mouflon, a type of Bighorn Sheep.

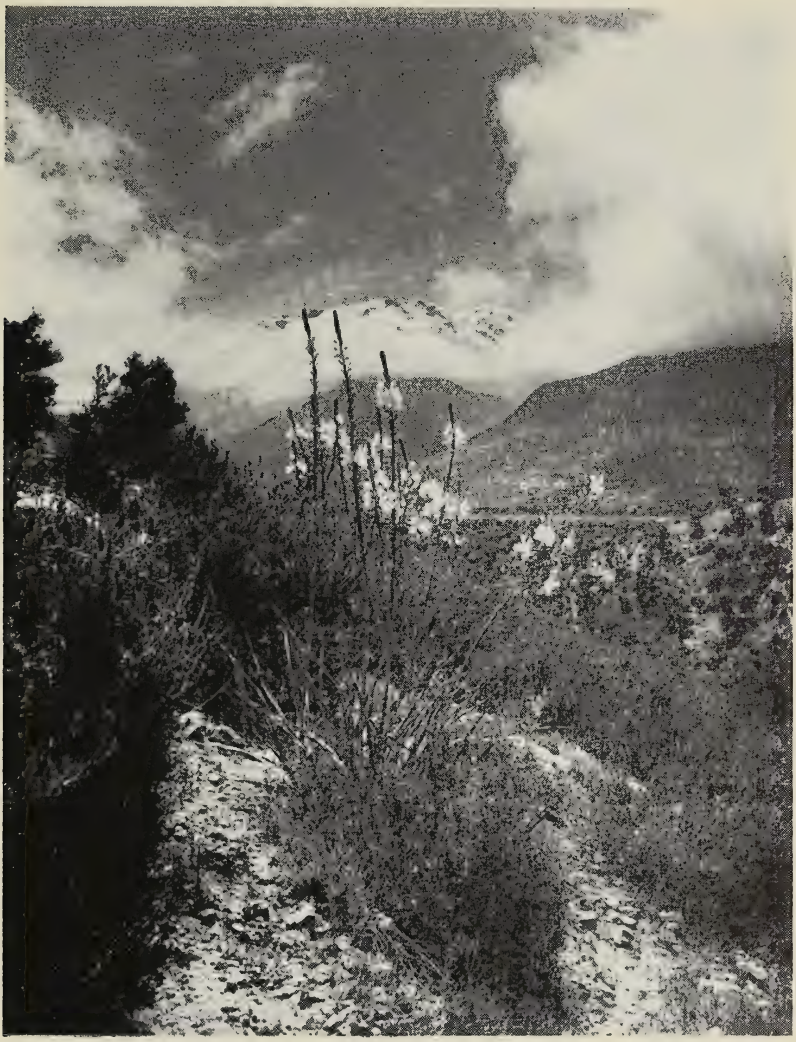

Fig. 2. Asphodel and Lavender at 4,000 ft. at Asni, with the 12,000 ft. Aksoual Range behind. Typical of mediterranean flora on the northern slopes of the foothills of the High Atlas.

Finally the desert foothills of the High Atlas must be mentioned. These are purely desertic in character, but several large rivers flow out through them to lose themselves in the sands of the desert, and along these the Berbers have organised an extensive system of irrigation, even out into the flat desert which here lies about 3,000 feet above sea level. Here they grow rich crops of alfalfa, corn, rye, date palms, peaches, apricots, figs, and the roses from which they distill the perfume of attar of roses. Otherwise the main desert plants are the spiny bushes of Camel-thorn, beloved of the little

Tarucus theophrastus "blues," *Capparis* the Caper bush, foodplant of *Teracolus,* Mallows, Rue, and the inevitable spiny Leguminosæ. Here fly the pierids *A. falloui, E. charlonia,* and *Teracolus nouna* in its three broods, also *P. machaon, P. icarus, C. phlæas, M. didyma occasus, Hesperia armoricanus,* and the greatest rarity of Morocco after *P. vogelii,* the little Skipper *Powellia adenensis doris.* This extraordinary butterfly is only known from the area between Ksar-es-Souk and Tinerhir; its next nearest population flies near Cairo in Egypt, while it was originally described from Aden on the Red Sea. Presumably it represents a pocket left behind from the ancient days before the Sahara became the desert it is today. Nearer the Atlantic coast, in the Souss Valley hard under the crags of the Toubkal massif, is more extensive agriculture, and here grows a species of Milkweed, bringing with it the African and Asiatic species *Danaus chrysippus,* of which some 30% are the white-suffused form "alcippus." In the groves of Acacia (*Mimosa*) flies the African "blue" *Azanus jezous,* while *P. machaon* and the small "blue" *Zizera lysimon* are fairly common in the fields.

In the Anti-Atlas I only took *P. machaon saharæ, Epinephele ida, Melitæa phœbe punica, Tarucus theophrastus, P. icarus,* and *Powellia ali.*

The following is a list of the species from the Atlas Mountains and the areas immediately adjoining them, including Marrakech, but omitting some species peculiar to the northern plains.

M.A. = Middle Atlas. H.A. = High Atlas. A.A. = Anti-Atlas. N.P. = northern plains. D. = desert & desert foothills. Months of emergence are noted by numerals. c. = common, l. = local, r. = rare.

Papilio machaon maxima Vrty. N.P., M.A., 5-7. l.c.
Papilio m. saharæ Obth. A.A., D. 5. l.
P. podalirius f. "maura" Vrty. N.P., M.A., 5-6. l.c.
P. podalirius f. "latteri" Aust. N.P., M.A., 7-8. l.c.
Zerynthia rumina africana St. M.A. 5. c.
Zerynthia r. ornatior Blach. H.A. 4-5. c.
Aporia cratægi mauretanica Röber. M.A. 5-6. c.
Pieris brassicæ venata Vrty. N.P., M.A., H.A., 4-7. c.
P. rapæ mauretanica Vrty. N.P., M.A., 4-7. c.
P. manni haroldi Wyatt. M.A., 6-7. l.r.
P. napi blidana Holl. M.A., H.A., 5-6. l.r.
P. napi segonzaci LeCerf. H.A. 6. l.c.
Pontia daplidice nitida Vrty. H.A., D., 4-5. c.
Euchloe eupheno L. M.A., H.A., N.P., 3-5. c.
E. charlonia Donz. H.A., N.P., D., 5. c.
E. charlonia levaillanti LeCerf. H.A., N.P., D., 3-4. c.
Anthocaris tagis mauretanica Röber. M.A., 5-6. l.r.
A. belemia röberi Roths. N.P., 3-4. c.
A. belemia distincta Röber. N.P., 4-5. c.
A. belia butleri Roths. N.P., M.A., H.A., 3-5. c.
A. belia turatii Roths. N.P., D., M.A., H.A., 4-6. c.
A. falloui Allard. D. 3-5. l.r.
Zegris eupheme ssp. nr. *meridionalis* Led. M.A., 5. l.c.
Gonepteryx cleopatra mauretanica Röber. H.A., M.A., 4-7. c.
G. rhamni meridionalis Röber. M.A., 5-6. c.

Teracolus daira nouna Lucas. D., 6-8. c.
Teracolus d. biskrensis Blach. D., M.A., 5-6. c.
Colias croceus Four. N.P., M.A., 3-5. c.
Danaus chrysippus L. D., 4-5. l.c.
Eugonia polychloros algirica Obth. M.A., 5-7. c.
Polygonia c-album imperfecta Blach. M.A., H.A., 5-7. l.r.
Euphydryas aurinia ellisoni Rungs. M.A., 5-6. l.c.
E. desfontainei gibrati Obth. M.A., 5. c.
Melitæa phœbe punica Obth. A.A., M.A., H.A., D., 4-6. c.
M. ætherie algirica Rühl M.A., 5-6. l.c.
M. cinxia atlantis LeCerf. M.A., 5. l.r.
M. didyma occasus Vrty. D., 5. c.
M. didyma mauretanica M.A., 5-7. c.
M. didyma interposita Roths. H.A., 4-7. c.
M. deserticola Obth. H.A., 4. l.r.
Issoria lathonia L. M.A., 5. c.
Argynnis lyauteyi Obth. M.A., 5-7. l.c.
A. auresiana Frhst. M.A., 5-7. l.c.
Dryas pandora seitzi Frhst. M.A., H.A., 5-7. c.
Pararge megæra vividissima Vrty. N.P., M.A., D., 5-6. c.
P. mœra alluaudi Obth. H.A., 7. l.r.
P. mœra meade-waldoi Roths. M.A., 8. l.r.
P. ægeria L. N.P., M.A., H.A., D., 4-5. c.
Melanargia galathea meade-waldoi Obth. M.A., 5. c.
M. ines Hffmg. N.P., 5. l.c.
M. i. colossea Obth. N.P., 4-5. l.c.
M. i. jahandiezi Obth. M.A., H.A., 5-7. l.c.
M. syllius pelagia Obth. M.A., 5-6. c.
Epinephele maroccana Blach. H.A., 7. l.c.
Epinephele m. nivellei Obth. M.A., 6-7. l.c.
E. lycaon mauretanica Obth. M.A., D., 5-6. c.
E. pasiphæ philippina Aust. N.P., M.A., 4-6. c.
E. ida neapolitana Obth. N.P., M.A., H.A., 4-7. c .
E. jurtina fortunata Alph. N.P., M.A., 5-6 .c .
Cœnonympha pamphilus arenosa Vrty. M.A., 5. c.
C. p. latevittata Vrty. M.A., 6-7. c.
C. vaucheri Blach. H.A., 7. l.c.
C. vaucheri annoceuri Wyatt. M.A., 5-7. l.c.
C. fettigii Obth. M.A., 6-7. l.c.
C. arcanioides Pier. M.A., 5-7. l.r.
Satyrus arethusa aksouali Wyatt. H.A., 7. l.r.
S. prieuri kebira Wyatt. M.A., 7-8. r.
S. alcyone maroccana Obth. M.A., 6-8. c.
S. briseis major Obth. M.A., 6-7. c.
S. semele algirica Obth. M.A., 6-8. c.
S. atlantis Aust. H.A., 7. c.
S. atlantis colini Wyatt. M.A., 6-7. c.
S. actæa simillima Roths. M.A., H.A., 6-7. c.
S. abdelkader lambessanus Obth. M.A., H.A., 6-7. l.c.
S. abdelkader taghzefti Wyatt. M.A., 6-7. l.c.
S. fidia albovenosa Obth. M.A., (H.A.) 7. l.c.
S. fidia guildi Varin. M.A., 7. l.r.
S. statilinus rungsi Varin. M.A., 7-8. c.
S. colombati & f. "belouini" Obth. M.A., 9. l.r.
S. hansii Aust. M.A., 9. l.r.
Zephyrus quercus iberica Stgr. M.A., 7-8. c.

Strymon esculi mauretanica Stgr. M.A., 6-7. c.
Callophrys rubi fervida Stgr. M.A., 5. c.
C. avis Chapman. M.A., H.A., 4-5. l.c.
Thestor mauretanicus Lucas. M.A., H.A., 2-4. c.
T. ballus F. N.P., M.A., 3-5. c.
Chrysophanus phœbus Blach. N.P., 5-7. l.r.
C. phlæas pseudophlæas Frhst. A.A., N.P., M.A., D., 3-5. c.
C. alciphron herakleana Blach. H.A., 7. l.r.
Lampides bœticus L. M.A., D., 3-4. c.
Tarucus pirithous Stmpf. N.P., M.A., 5-6. c.
T. theophrastus F. A.A., N.P., D., 5. c.
Cigaritis zohra monticola Blach. M.A., 5. l.c.
Azanus jesous Guérin. D., N.P., 4-5. l.c.
Zizera lysimon Hbn. N.P., D., 3-5. c.
Z. lorquinii H-Sch. M.A., 5. l.c.
Philotes bavius fatma Obth. M.A., 5. l.c.
P. vogelii Obth. M.A., 8. l.r.
P. abencerragus Pier. H.A., M.A., D., 4-5. c.
Plebeius montensis Vrty. M.A., 6-7. c.
P. cramera ornata Stgr. N.P., M.A., 3-5. c.
P. c. calida Bell. M.A., 6-7. c.
Polyommatus allardi Obth. M.A., 5. r.
P. a. ungemachi Obth. H.A., M.A., 6. r.
P. martini Allard. M.A., 5-6. l.c .
P. icarus rosina Holl. N.P., M.A., D., A.A., 5-6. c.
P. thersites Hb. ssp. M.A., 5-6. l.c.
P. escheri ahmar Le Cerf. M.A., 6. l.r.
P. bellargus punctifera Obth. H.A., M.A., 4-6. c.
P. amandus abdelaziz Blach. M.A., 5-6. l.c.
Lysandra atlanticus Elwes. M.A., 6. r.
L. albicans berber Le Cerf. M.A., 7. l.r.
Glaucopsyche semiargus maroccana Obth. M.A., 5. c.
G. melanops alluaudi Obth. H.A., M.A., 4-5, 7. c.
Lycænopsis argiolus mauretanica Roths. M.A., 5-7. c.
Carcharodus alcææ australis Zeller. M.A., D., 5. c.
C. lavateræ rufescens Obth. M.A., 5-6. r.
C. stauderi Rev. M.A., H.A., 6. c.
Hesperia sifanica numida Obth. M.A., 6. r.
H. onopordi fulvotincta Vrty. M.A., H.A., D., 4-7. c.
H. armoricanus maroccanus Pic. M.A., D., 5. c.
Sloperia proto gigas Vrty. N.P., M.A., 4-5. c.
S. mohammed Obth. M.A., 7-8. r.
S. m. f. "caid" Le Cerf. M.A., H.A., 4-5. r.
Powellia ali Obth. M.A., A.A., H.A., 4-5. c.
P. adenensis doris Riley. D., 5. l.r.
Adopæa linea iberica Tutt. M.A., 5-6. c.
A. actæon Rott. ssp. N.P., 5. r.
A. lineola O. ssp. M.A., 5-6. r.
A. hamza Obth. M.A., 6-7. c.
Erynnis pallida benuncas Obth. H.A., M.A., 7-8½. c.
Gegenes nostrodamus F. N.P., D., 4-5. l.r.

Cobbetts, Farnham, Surrey, ENGLAND

RECENT LITERATURE ON LEPIDOPTERA

(Under the supervision of PETER F. BELLINGER)

For explanatory note, see preceding issues of the *News.*

A. GENERAL

Schuler, J. E., Friedrich Schnack, & Josef Bijok, *Fliegende Kleinodien. Ein farbiges Falterbuch.* [in German]. 194 pp., 42 col. pls. Stuttgart: Seewald & Schuler. 1955. Magnificent color plates of spectacular Lepidoptera; with a brief account of the biology of Lepidoptera. [P.B.]

B. SYSTEMATICS AND NOMENCLATURE

International Commission on Zoological Nomenclature, "Opinion 282. Determination of the species to which the specific name *plexippus* Linnæus, 1758, as published in the combination *Papilio plexippus* (Class Insecta, Order Lepidoptera) shall be held to apply." *Opin. Decl. Intern. Comm.,* vol.6: pp.225-268, 1 pl. 1 Oct. 1954. The neotype of *plexippus* is selected as the specimen figured by Clark in *Proc. U. S. Natl. Mus.,* vol.90, pl.71, fig.1 (1941) (figure reproduced here); type locality is Kendall, N. Y.; *plexippus* is placed on the *Official List.* [P.B.]

International Commission on Zoological Nomenclature, "Opinion 286. Suppression, under the Plenary Powers, of the specific name *ajax* Linnæus, 1758, as published in the combination *Papilio ajax* (Class Insecta, Order Lepidoptera)." *Opin. Decl. Intern. Comm.,* vol.8: pp.29-48. 12 Oct. 1954. Placed on *Official Index: ajax, xanthus* Linn. (invalid original spelling for *xuthus*); *xuthus* is placed on the Official List. [P.B.]

International Commission on Zoological Nomenclature, "Opinion 382. Validation under the Plenary Powers of the generic name *Sicyonia* Milne Edwards (H.), 1830 (Class Crustacea, Order Decapoda) and action consequential thereto." *Opin. Decl. Intern. Comm.,* vol.12: pp.43-58. 24 Jan. 1956. Suppresses *Sicyonia* Hbn.; places on *Official List Heliconius* Kluk and its type *charithonia* Linn. (*Sicyonia* is a synonym of *Heliconius*); places on *Official Index: Sicyonia* Hbn., *Heliconius* Linn., *Heliconius* Latreille, *Heliconia* Godart, *Apostraphia* Hbn. [P.B.]

International Commission on Zoological Nomenclature, "Opinion 400. Validation under the Plenary Powers of the generic name *Melanargia* Meigen, 1828 (Class Insecta, Order Lepidoptera)." *Opin. Decl. Intern. Comm.,* vol.12: pp.419-432. 16 July 1956. *Agapetes* Billberg is suppressed for purposes of priority but not of homonymy; *Melanargia, galathea Linn.* (its type species) and *lachesis* Hbn. are placed on the *Official Lists; Arge* Hbn. is placed on the *Official Index.* [P.B.]

International Commission on Zoological Nomenclature, "The official record of proceedings of the International Commission on Zoological Nomenclature at their session held in Paris in July, 1948." *Bull. Zool. Nomencl.,* vol.4: 760 pp. 1950. Record of meetings and preliminary notice of decisions, including some of particular interest to lepidopterists. All decisions have been, or will be, published in the *Opinions.* [P.B.]

Janse, A. J. T., "The methods and aims of taxonomic study in entomology, with special reference to Lepidoptera." *So. African Journ. Sci.,* vol.25: pp.107-112. March 1949.

Kauffman, G., "*Reverdinus flociffer habiba* n.ssp. (Lepidopt. Hesperiidæ)" [in German]. *Mitt. Schweiz. Ent. Ges.,* vol.28: pp.288-290, 8 figs. Oct. 1955. Description of the new subspecies from Spanish Morocco. [P.V.]

Kiriakoff, S. G., "Recherches sur les organes tympaniques des lépidoptères en rapport avec la classification. IX. Arctiidæ" [in French]. *Bull. & Ann. Soc. Ent. Belg.,* vol.88: pp.26-50, 7 figs. 29 Feb. 1952. Proposes the new higher categories ENDROSIDÆ; NYCTEMERINES, ARCTIINES (supertribes of Arctiinæ); ARCTIINI, RHODOGASTRINI (tribes of Arctiines); CTENUCHINES, AMATINES (supertribes of Ctenuchinæ). Describes tympanic organs of 26 spp.; removes *Atolmis* to lithosiids; regards *Diacrisia* and *Pericallia* as composite genera, and describes as new *SEYDELIA* (type *P. ellioti*). Remarks on the arctiid complex, justifying the new classification. [P.B.]

Kiriakoff, S. G., "Contribution à l'étude des lépidoptères hétérocères (3e note). Zygænidæ nouveaux du Congo Belge" [in French]. *Bull. Inst. Roy. Sci. Nat. Belg.,* vol.30, no.42: 8 pp., 8 figs. Dec. 1954. Describes as new (Belgian Congo): *Arniocera rectifascia, A. vanstraeleni, A. elliptica, A. inornata; Byblisia micans; Pedoptila psalidoprocne; Semioptila hedydipna, S. macrodipteryx.* List of some other Zygænidæ from the same country. [P.V.]

Kiriakoff, S. G., "Onderzoekingen over de Gehoororganen bij Vlinders met Betrekking tot de Classificatie. XI. Agaristidæ" [in Flemish, French summary]. *Verh. Kon. Vlaamsche Akad. Wet. Lett. België,* no.47: 70 pp., 38 figs. 1954. It is a pity that this important paper on the study of the tympanal organ in the Agaristidæ was published in Flemish, a very little-known language. Many species are studied, with general considerations on the family following. Fortunately the French summary is extensive. [P.V.]

Kiriakoff, S. G., "Contribution à l'étude des lépidoptères hétérocères (4^e note). Sur les Agaristidæ du Congo Belge" [in French]. *Bull. Inst. Roy. Sci. Nat. Belg.,* vol.31, no.69: 7 pp., 3 figs. Nov. 1955. Describes as new *CHARITOSEMIA* (type *geraldi* Kirby); *Ægocera jordani* (Belgian Congo); *Heraclia hornimani meridionalis* (Belgian Congo). [P.V.]

Kiriakoff, S. G., "Le système phylogénétique: Principes et méthodes" [in French]. *Bull. & Ann. Soc. Ent. Belg.,* vol.91: pp.147-158. 30 June 1955. Account of phylogenetical principles and methods, with reference to the different publications of Henning. Opposition, according to the author, between the typological system and the phylogenetic system. Paleontology, geology, chorology, morphology, genetics, serology, and biochemistry are the basis of the phylogenetic system. The author defends his classification, published in 1948 and adopted, in large part, by Hennig. Many technical terms are employed or created. The divisions into suborders, infraorders, superlegions, sublegions and supercohorts might seem too numerous to many specialists. The important discovery of a tympanal organ in the Cossidæ is reported. [P.V.]

Kiriakoff, S. G., "New genera and species of African Notodontidæ (Lepid.)." *Rev. Zool. Bot. Afric.,* vol.52: pp.36-348, 2 pls., 18 figs. 30 Dec. 1955. Describes as new *Brachychira argentina* (Sankuru), *B. subargentea* (Sankuru), *B. ligata* (Sankuru), *B. numenius* (Sankuru); *Cerasana rothschildi* (Sierra Leone), *C. eos* (Sankuru); *Overlaetia glaphyra* (N.W. Rhodesia); *DERIDDERA,* and type *D. margarethæ* (Sankuru); *Atrasana olivacea* (Angola); *IRIDOPLITIS,* and type *I. iridescens* (N.W. Rhodesia); *SIMESIA* (type *dasychiroides* Btl.), *S. orestes* (Angola), *S. pylades* ("German S.W. Africa"); *PROSPHOLITIS,* and type *P. aglaurus* (Nyasaland); *Catochria postflava* (Natal); *Rigema amphiaraus* (Gold Cost). [P.V.]

Kiriakoff, S. G., "Sur le status taxonomique d'*Erebia tyndarus* Esper" [in French]. *Lambillionea,* vol.55: pp.90-93. 25 Dec. 1955. Application of the taxa proposed by the author to the *E. tyndarus* complex. [P.V.]

Kozhanchikov, I. V., "Insecta Lepidoptera. Bagworms (fam. Psychidæ)" [in Russian]. *Fauna SSSR,* n.s., no.62: 517 pp., 334 figs. Moscow: Akad. Nauk SSSR. 1956. Describes following as new (Psycheoidinæ): *EUMELASINA,* and type *E. ardua* (Guberlia R., SE Ural region), *E. pliginskii* (Sevastopol, Crimea), *E. arguta* (Ordubad, E. Transcaucasia); *MELAPSCHE,* and type *M. multivenosa* (Great Never, Amur R. region); *Fumea elongatella* (N. Caucasus), *F. ussuriensis* (S. Sikhote-Alin'); *PSEUDODIPLODOMA* (type *Diplodoma ragonoti*); *Taleporia caucasica* (Borzhom, Transcaucasia); *Solenobia albiflavella* (Huzar, SW foothills of Hissar Range, Central Asia); *Epichnopterix crimæana* (Sevastopol); *Bijugis songarica* (R. Almatinka, Trans-Iliisk Ala-Tau, Central Asia), *B. subgrisea* (Iakovlevka, south shore, S. Sikhote-Alin'); *PSYCHIDOPSIS* (type *Bijugis alpherakii*). (Psychinæ): *Oiketicoides leoi* (near Stalinabad, Tadzhikistan), *O. demarcata* (Margelan, Bukhara, Central Asia), *O. squamopilosa* (Fergana & Zalaisk Mts., Central Asia), *O. nigripilosa* (Anzob Pass, Hissar Mts., Central Asia), *O. heptapotamica* (Chu R. valley, Kirgizia, Central Asia), *O. theodori* (Ili R. valley, SE Kazakhstan), *O. simulans* (Ianvartsevo, SE Ural region), *O. unicolorata* (Erevan, Armenia); *Acanthopsyche incana* (S. Ural region), *A. subatrata* (Vinogradovka, Dalnii Vostok), *A. desertella* (Aram-Kungei, Zalaisk Mts., Central Asia); *Amictoides borealis* (Dagestan, Caucasus), *A. minuta* (Araksa R. valley, Transcaucasia), *A. plotnikovi* (barren steppe, Samarkand), *A. eldarica* (Eldar Mts., Kuri R. valley), *A. acuta* (Kirovabad, Kuri R. valley), *A. acutipennis* (Darasham, Transcaucasia), *A. subgrisea* (Araksa R. valley, Transcaucasia); *Psyche brachycornis* (Kerch, E. Crimea); *Apterona orientalis* (Araksa R. valley); *PTILAMICTA,* and type *P. erythropyga* (Ordubad, Transcaucasia). General account of morphology, biology, and distribution of family, and systematic revision of Russian species. See review in *Lepid. News,* vol.10: pp.177-178. [P.B.]

de Lesse, H., "Une nouvelle formule chromosomique dans le groupe d'*Erebia tyndarus* Esp. (Lépidoptères Satyrinæ)" [in French]. *C. R. Acad. Sci. Paris,* vol.241: pp.1505-1507. Nov. 1955. A new chromosome number in the *E. tyndarus* group: *E. iranica* ($n=51$). Lectotypes are designated for *E. dromulus* and *E. cassioides.* [P.V.]

Lorkovic, Z., & H. de Lesse, "Note supplémentaire sur le groupe d'*Erebia tyndarus* Esp." [in French]. *Lambillionea,* vol.55: pp.55-58. Nov. 1955. The authors consider *E.*

nivalis (n=11) and *E. calcarius* (n=8) as good species. On the contrary, *E. tyndarus* (2n=20 in two massifs of the Alps) and *E. cassioides* (2n=20 in nine massifs of the Alps) have still the status of semispecies, their existence together being still unproved. [P.V.]

Marion, H., "Pyrales nouvelles de Madagascar (Lep.)" [in French]. *Bull. Soc. Ent. France,* vol.60: pp.114-119, 6 figs. 15 Dec. 1955 Describes as new (all from Madagascar): *PERINETOIDES* (Galleriidæ), and type *P. margaritalis; Doddiana cyanifusalis; BETSIMISARAKA* (Epipaschiinæ) and type *B. viettealis; Peucela ignealis; ANTISINDRIS* (Pyralinæ) and type *A. bipunctalis; Prosaris hepaticalis, P. percuprealis.* [P.V.]

Marion, H., "Les *Coptobasoides* de Madagascar avec description de deux espèces nouvelles (Lep. Pyraustidæ)" [in French]. *Nat. Malgache,* vol.7: pp.191-194, 3 figs. Feb. 1956. Study of this pyralid genus in Madagascar; describes as new *C. pauliani, C. latericalis* (both from E. Madagascar). [P.V.]

Mere, R. M., "What next?" *Ent. Gaz.,* vol.6: pp.224-227, 2 figs. Oct. 1956. Speculation on future discoveries in the British fauna. Figures ♂ genitalia of *Cosymbia quercimontaria* and *C. punctaria.* [P.B.]

Muñoz, Fernando de Zayas, & Pastor Alayo Dalmau, "La familia Sphingidæ en Cuba (Lepidoptera: Heterocera). *Publ. Univ. de Oriente,* no.40: 85 pp., 16 pls., 1 col. fig. 1956. Lists the 59 recorded species, with synonymy, brief descriptions, known foodplants, and distribution; 58 spp. figured. [P.B.]

Murray, Desmond, "The genitalia of some South African lycænids (Lepidoptera: Lycænidæ)." *Journ. Ent. Soc. So. Afr.,* vol.10: pp.182-192, 2 pls., 2 figs. 31 March 1948. Briefly describes and figures ♂ genitalia of 45 spp. of *Iolaus, Lachnocnema, Lycæna, Teriomima, Durbania, Alæna, Pentila, Chlorosela, Spindasis, Dendorix* (sic!), *Axiocerces, Capys, Myrina, Hippolycæna, Leptomyrina, Aphaneus* (sic!), *Stugeta, Thestor.* Localities of specimens given. Notes on a few other spp., not available or doubtfully distinct. [P.B.]

Obraztsov, N., "*Laspeyresia interruptana* (HS.) als selbständige Art (Lep. Tortr.)" [in German]. *Ent. Tidskr.,* vol.73: pp.33-37, 5 figs. 10 May 1952. Redescribes species and distinguishes it from *L. duplicana and L. illutana.* [P.B.]

Orfila, Ricardo N., "Lepidopteros de Venezuela, nuevos o poco conocidos. — 1ª nota" [in Spanish]. *Bol. Ent. Venezol.,* vol.9: pp.45-49, 6 figs., 1 map. 1950. Describes as new *Evonyme norica lichyi* (Caracas); gives distribution of the 3 sspp. of this butterfly. [P.B.]

Orfila, Ricardo N., "Notas sobre Lithosiidæ (Lepid.) I. El género *Eudesmia* Hb. y un genero y especie nuevos" in Spanish. *Physis,* vol:20: pp.474-486, 2 figs. 1953. Describes as new *VIANANIA* (type *Cisthene argentinensis); V. aymara* (Cochabamba, Bolivia). Redescribes *Eudesmia* and spp. assigned to it and to *Viananía.* [P.B.]

Orfila, Ricardo N., "Una nueva especie de *Apatelodes* (Lep. Eupteropt. [*sic!*])" [in Spanish]. *Natura,* Buenos Aires, vol.1: pp. 131-134, 3 figs. 1955. Describes as new *A. gaitotini* (Leandro N. Alem, Misiones, Argentina). [P.B.]

Osthelder, Ludwig, *Die Schmetterlinge Südbayerns und der angrenzenden nördlichen Kalkalpen. II. Teil. Die Kleinschmetterlinge. 2. Heft. Glyphipterygidæ bis Micropterygidæ.* pp. 115-250, 3 figs. München, 1951. Describes as new: (*Gelechiidæ*) *Gelechia danieli* (Ammergauer Alps); (Tineidæ) *Tinea submontana* (Kochel); figures ♂ genitalia. Annotated list. [See review in *Lepid. News,* vol.10: p.56]. [P.B.]

Paclt, Jiří, "A propos de la nomenclature de deux genres de Microlépidoptères nuisibles aux essences forestières" [in French]. *Rev. franç. Lépid.,* vol.13: p.127. "Sept./-Oct." [28 Dec.] 1951. Proproses *KENNELIOLA n.n. for Crobylophora* Kennel (Tortricidæ); *EUCEDESTIS* n.g. (type *Cedestis gysselinella*) (Yponomeutidæ). [P.B.]

Paclt, Jiří, "A comment on the proposed solution of the *niobe/cydippe/adippe* problem (Class Insecta, Order Lepidoptera)." *Bull. Zool. Nomencl.,* vol.9: p.131. 30 Dec. 1952. Opposed to conservation of *adippe;* regards *phryxa* as the correct name for the High Brown Fritillary. [P.B.]

Paclt, Jiří, "Dr. John G. Franclemont's proposal for the use of the Plenary Powers to suppress the generic name *Phalæna* Linnæus, 1758, and to validate, as from 1758, the terms employed by Linnæus for groups of that genus (Class Insecta, Order Lepidoptera): proposed addition of *Phalæna* Linnæus, 1758, to the *Official List of Generic Names in Zoology." Bull. Zool. Nomencl.,* vol.9: pp.147-148. 30 Dec. 1952. Regards Franclemont's proposal as unnecessary for most of the names involved, as these are generally accepted as valid from 1775, with the same types; requests have already been made to validate the doubtful cases (*Bombyx* and *Pyralis*) from the latter date. Regards type of *Phalæna* as different from type of *Noctua.* [P.B.]

Paclt, Jiří, "Proposed use of the Plenary Powers to designate a type species for *Sphinx* Linnæus, 1758 (Class Insecta, Order Lepidoptera) in harmony with accustomed usage." *Bull. Zool. Nomencl.,* vol.6: p.291. 29 Aug. 1952. Suggests designation of *ligustri* as type and rejection of Latreille's designation of *euphorbiæ.* [P.B.]

Paclt, Jiří, "Proposed use of the Plenary Powers to designate for *Bombyx* Fabricius, 1775 (Class Insecta, Order Lepidoptera) a type species in harmony with current nomenclatorial usage." *Bull. Zool. Nomencl.,* vol.6: pp.313-314. 29 Aug. 1952. Suggests designation of *mori* as type. [P.B.]

Paclt, Jiří, "Proposed use of the Plenary Powers to designate for *Pyralis* Fabricius, 1775 (Class Insecta, Order Lepidoptera) a type species in harmony with current nomenclatorial usage." *Bull. Zool. Nomencl.,* vol.6: pp.314-315. 29 Aug. 1952. Suggests designation of *farinalis* as type. [P.B.]

Paclt, Jiří, "Proposed use of the Plenary Powers to vary the type species of *Episema* Ochsenheimer, 1816, therapy maintain *Diloba* Boisduval, 1840, for use in its accustomed sense (Class Insecta, Order Lepidoptera)." *Bull. Zool. Nomencl.,* vol.6: pp.315-317. 29 Aug. 1952. Proposed designation of *glaucina* as type for *Episema* and *cæruleocephala* as type for *Diloba.* [P.B.]

Paclt, Jiří, "Proposed use of the Plenary Powers to validate the generic name *Melanargia* Meigen, 1828 (Class Insecta, Order Lepidoptera), by suppressing the name *Agapetes* Billberg, 1820." *Bull. Zool. Nomencl.,* vol.9: pp.211-222. 11 May 1954.

Paclt, Jiří, & Jiří Šmelhaus, "Revision of the Hesperiidæ occurring in Czechoslovakia" [in Slovak, English summary]. *Prír. Sborník,* vol.3: pp.201-221, 8 figs. 1948. All species known from Czechoslovakia are given. The paper has an appendix in English (pp.218-220): Arguments against the acceptance of the *Systematisches Verzeichnis* names. The names published by Denis & Schiffermüller 1775 are discussed. [J.M.]

dos Passos, Cyril F., "On the proposal that the trivial name *ajax* Linnæus, 1758 (as published in the binominal combination *Papilio ajax*) should be suppressed by the International Commission on Zoological Nomenclature under its Plenary Powers." *Bull. Zool. Nomencl.,* vol.2: pp.349-350. 28 Sept. 1951.

dos Passos, Cyril F., "Application to the International Commission on Zoological Nomenclature to reconsider and rephrase in part their decision suspending the *Règles* concerning *Papilio plexippus* Linnæus, 1758, insofar as that decision refers to a figure in Holland's *Butterfly Book." Bull. Zool. Nomencl.,* vol.6: pp.278-283. 23 July 1952.

dos Passos, Cyril F., "In support of the application to suspend the Rules to (a) validate seven generic names of Linnæus as of 1758, and designate their type species (b) suppress the generic name *Phalæna* Linnæus, 1758, give preference to its typical subgenus *Noctua,* declare Noctidæ the correct name for the family, and (c) validate one generic name of Linnæus as of 1767 and designate its type species (Class Insecta, Order Lepidoptera)." *Bull. Zool. Nomencl.,* vol.9: pp.153-154. 30 Dec. 1952.

dos Passos, Cyril F., & Ernest L. Bell, "Request for a ruling as to the specimen to be accepted as the lectotype of *Megathymus aryxna* Dyar, 1905 (Class Insecta, Order Lepidoptera)." *Bull. Zool. Nomencl.,* vol.11: pp.289-294. 30 Dec. 1955. Authors believe lectotype should be a specimen figured as *M. neumoegeni* in *Biol. Centrali-Americana;* this would cause *aryxna* to fall to *neumoegeni.* [P.B.]

Pennington, K. M., "Two new species of Lycænidæ (Lepidoptera, Rhopalocera) from South Africa." *Journ. Ent. Soc. So. Afr.,* vol.10: pp.164-169, 1 pl. 31 March 1948. Describes as new *Cupido (Lepidochrysops) swanepoeli* (Sheba Mine, Barberton Distr., Transvaal); *Deudorix vansoni* (Hluhluwe, Zululand). [P.B.]

Povolny, D., & J. Moucha, "Beitrag zur Kenntnis der Gattung *Psodos* Tr. in den Karpaten (Lepidoptera — Geometridæ)" [in German]. *Ent. Nachrbl.,* vol.7: pp.1-4, 2 figs. March 1955. Notes on Carpathian distribution of 6 spp. (4 with endemic sspp.). Figures ♂ genitalia of *P. noricana carpathica* & *P. bentelii.* [P.B.]

Povolny, Dalibor, & Josef Nosek, "On the phylogenetic relations in the Bistoninæ (Geometridæ), with special regard to *Pœcilopsis." Lepid. News,* vol.9: pp.199-202, 9 figs. 16 April 1956.

Rabello, Ernesto Xavier, "Contribução para o conhecimento dos Ctenuchidæ. VI. Gênero *Tipulodes* Boisduval, 1830 (Lepidoptera)" [in Portuguese, English abstract]. *Arq. Mus. Nac. Rio de Janeiro,* vol.42: pp.469-476, 3 pls. 1955. Redescribes generotype, *T. ima,* and repeats description of *T. rubriceps.* [P.B.]

Roepke, W., "*Delias* in Nieuw-Guinea (Lep.)" [in Dutch]. *Ent. Berichten,* vol.15: p.495. 1 Oct. 1955.

Roepke, W., "Notes and descriptions of Cossidæ from New Guinea (Lepidoptera: Heterocera)." *Trans. Roy. Ent. Soc. London,* vol.107: pp.281-288, 2 pls. 6 Dec. 1955. Describes as new: *Xyleutes mineus pallescens* (Hollandia), *X. cinerosa* (Humboldt Bay), *X. jordani* (Cyclops Mts.), *X. papuana* (Ampas), *X. elegans* (Mook Camp), *X. albicans* (Biak) *X. perdrix* (Ampas); *Dudgeonea nummata* (Hollandia); also one 'form'. Proposes *turneri* n.n. for *Xyleutes leucolopha* Turner *nec* Guérin. Revisional notes and redescriptions of other *Xyleutes* and of *Zeuzera* spp. [P.B.]

Slabý, Otto, "Ueber die Herkunft des Apollofalters (*Parnassius apollo* L.) in den Slowakischen Karpatengebirgen" [in Czech, Russian & German summaries]. *Biológia,* Bratislava, vol.9: pp.398-411. 1954. Discusses the phylogeny of *P. apollo* from Western Carpathians with remarks on the study by Issekutz, 1951. [J.M.]

Slabý, Otto, "*Parnassius apollo* L. im Pieninengebiet" [in Czech, Russian & German summaries]. *Biológia,* Bratislava, vol.10: pp.179-188. 1955. Describes as new *P. a. frankenbergeri* (Pieniny Mts., Slovakia). Without figures. [J.M.]

Stallings, Don B., & J. R. Turner, "On the question of the lectotype of *Megathymus aryxna* Dyar, 1905." *Bull. Zool. Nomencl.,* vol.11: pp.295-296. 30 Dec. 1955. Authors believe holotype should be a specimen in the U. S. National Museum labelled by Dyar as a cotype; this would retain *aryxna* for a species distinct from *M. neumoegeni.* [P.B.]

Stallings, Don B., & J. R. Turner, "Notes on *Megathymus ursus,* with description of a related new species (Megathymidæ)." *Lepid. News,* vol.10: pp.1-8, 2 pls. 10 Aug. 1956. Describes as new *M. violæ* (Carlsbad Caverns National Park, N. Mex.).

Swensson, Ingvar, "*Swammerdamia lapponica* Petersen i Sverige (Lep.)" [in Swedish, German summary]. *Ent. Tidskr.,* vol.75: pp.204-207, 1 fig. 30 Dec. 1954. Describes previously unknown ♀ of this species, new to Sweden; compares moth with *S. conspersella* & *S. compunctella.* [P.B.]

Swanepoel, D. A., "A new species of *Cupido* (Lycænidæ) from the Eastern Transvaal." *Journ. Ent. Soc. So. Africa,* vol.10: pp.193-195, 4 figs. 31 March 1948. Describes as new *C. (Lepidochrysops) irvingi* (Nelshoogte, Barberton, Transvaal). [P.B.]

Travassos, Lauro, "Contribução ao conhecimento dos Arctiidæ XXXI. Sôbre as espécies do gênero *Phegoptera* (Lepidoptera, Heterocera)" [in Portuguese]. *Arq. Mus. Nac. Rio de Janeiro,* vol.42: pp.621-643, 12 pls. 1955. Describes as new *P. pseudocatenata* (Salesopolis, S. Paulo, Brazil); *P. fusca* (Terezópolis, Est. do Rio, Brazil); *P. albescens* (Campos do Jordao, S. Paulo, Brazil); *P. pulchra* (Salesopolis); *. alipioi* (Salesopolis). Proposes *P. drucei* n.n. for *superba* Druce 1911. Redescribes genus and available spp. [P.B.]

Travassos Fº., Lauro, "*MIRANDISCA,* novo gênero para *Cosmosoma harpalyce* Schaus, 1892, com descrição do allotypus" [in Portuguese; English summary]. *Arq. Mus. Nac. Rio de Janeiro,* vol.42: pp.669-674, 3 pls. 1955. Proposes new genus and describes allotype of *M. harpalyce.* [P.B.]

Viette, Pierre E. L., "Contribution à l'étude des Hepialidæ (31ème note). Sur quelques spécimens du Tring Museum" [in French]. *Trans. Roy. Ent. Soc. London,* vol.107: pp.373-379, 6 figs. 6 Dec. 1955. Describes as new *Eudalaca jordani* (Mt. Moco, Luimbale, Angola); *Gorgopis libania angolensis* (Mt. Moco); *Paragorgopis nigrovenosalis* (Aqua Suja, Minas Geraes, Brazil), *P. spitzi* (Ypiranga, São Paulo, Brazil), *P. jordani* (Theophilo Ottoni, San Jacintho Valley, Minas Geraes); *Xytrops pluriargenteus* (Alto da Serra, São Paulo); *Schaefferiana simplex* (Theophilo Ottoni). Figures ♂ genitalia of new spp. [P.B.]

Viette, P., "Note de nomenclature: sur deux genres de Ch. Oberthür" [in French]. *Lambillionea,* vol.55: p.97. 25 Dec. 1955. A new name, *BOISDUVALODES,* is proposed for *Perrotia* Oberthür, 1922 (Zygænidæ), preoccupied by *Perrotia* Oberthür, 1916 (Hesperiidæ). [P.V.]

Viette, P., "Un nouveau cosside de Madagascar" [in French]. *Lambillionea,* vol.55: pp.98-99, 1 fig. 25 Dec. 1955. Describes as new *Pseudocossus boisduvalii* (central Madagascar) (Cossidæ). [P.V.]

Viette, P., "Position systématique et appareil stridulant de *Pemphigostola synemonistis* Strand, de Madagascar (Lep. Noctuidæ)" [in French]. *Bull. Soc. Ent. France,* vol.60: pp.176-179, 5 figs. 10 Feb. 1956. *P. synemonistis,* described as a castniid, is, in fact, a noctuid (Agaristinæ). The stridulating organ, on the mesothoracic legs and anterior wing, is described. [P.V.]

Vine Hall, J. H., "The British races of *Aricia agestis* Schiff. (Lep: Lycænidæ)." *Ent. Gaz.,* vol.5: pp.3-8. 18 March 1954. Suggests that the supposed hybrid population between *A. a. agestis* and *A. a. artaxerxes* is a southern race of the latter, which is believed to be a relict, unlike the recent southern immigrant *agestis.* [P.B.]

Warren, B. C. S., "A review of the classification of the subfamily Argynninæ (Lepidoptera: Nymphalidæ). Part 2. Definition of the Asiatic genera." *Trans. Roy. Ent. Soc. London,* vol.107: pp.381-392, 4 pls. 6 Dec. 1955. Lists 13 genera in subfamily, defines *Childrena, Damora,* and *Argyreus,* and emends definition of *Argyronome* and *Argynnis.* Lists included spp. (except in *Speyeria*) and discusses genitalic variation. 39 photos of ♂ genitalia. [P.B.]

Wightman, A. J., "*Nonagria neurica* Hb. fig.381 (*nec* fig.659-661) (*edelsteinii* Tutt)." *Ent.. Gaz.,* vol.2: pp.243-246, 1 pl. Oct. 1951. Discusses nomenclatorial history, describes early stages; adult figured in color. [P.B.]

Wightman A. J., "*Aporophyla lutulenta* Schiffermueller, 1775 and *A. lunebergensis* Freyer, 1848 (Lepidoptera: Agrotidæ)." *Ent. Gaz.,* vol.6: pp.217-223. Oct. 1954. Taxonomic history, distinction between supposed spp., and summary of named forms. [P.B.]

Wolff, Niels L., "Notes on the synonymy of some Tortricina (Lep.)." *Ent. Tidskr.,* vol.73: pp.53-64, 2 figs. 10 May 1952. Sinks *Tortrix ulmana* to *Olindia schumacherana; T. lithargyrana* and *Peronea fissurana* to *Acleris tripunctulana; Grapholitha æmulana* to *Eucosma latiorana; Pœcilochroma pomedoxana* to *Argyroploce porphyrana.* Maintains that *pascuana* is the correct spelling for *Cnephasia pasivana auctt.* Selects lectotype of *Acleris ferrugana.* Paper based on study of types in the British Museum, Copenhagen Museum, and Hungarian Museum collections. [P.B.]

F. BIOLOGY AND IMMATURE STAGES

Foltin, Hans, "Etwas über das Aufsuchen der Psychiden-Säcke" [in German]. *Zeits. Wiener Ent. Ges.,* vol. 38: pp. 7-12. 1 March 1953. Directions for finding larval cases of Psychidæ; describes appearance of cases of 13 spp., with biological notes. [P. B.]

Foucart, G., "Le sphinx du quinquina *Celerio nerii* L." [in French]. *Bull. Agric. Congo Belge,* vol. 45: (*Bull. Inform. INEAC,* vol.3): pp.111-122, 1 fig. April 1954. Biology and control; describes all stages. [P. B.]

Franz, Elli, "Das zierliche Puppengespinst der Motte *Trichostibas*" [in German]. *Natur und Volk,* vol. 85: pp. 115-118, 2 pls. 1 April 1955. Describes and figures network cocoon of this hyponomeutid from South America. [P. B.]

Franz, Jost M., "Observations on collecting parasites of *Cacœcia histrionana* (Froel.) (Lep., Tortricidæ)." *Bull. Ent. Res.,* vol. 43: pp. 1-19, 3 pls., 2 figs. March 1952. Biology of host; list of hymenopterous parasites, and discussion of parasitism in different stages; biology of dominant parasite, with its alternate hosts. [P. B.]

Franz, J., "Schlupfwespen als Helfer bei der Schädlingsbekämpfung" [in German]. *Natur und Volk,* vol. 80: pp. 271-275, 1 pl., 4 figs. 15 Oct. 1952. Parasitization of caterpillars by chalcids and braconids. [P. B.]

Freeman, John A., "Insect menace to stored products." *New Biology,* no. 4: pp. 48-73, 9 pls. 1948. Popular account, referring to *Ephestia, Plodia, Sitotroga,* etc. [P. B.]

Freeman, J. A., "The inter-relation of insect attack on stored food and wood." *Trans. 9th Int. Congr. Ent.,* vol. 1: pp. 710-722, 1 fig. March 1953.

Froeschner, Richard C., "Observations of predators of European Corn Borer eggs." *Proc. Iowa Acad. Sci.,* vol. 57: pp. 445-448. 1950.

Frost, S. W., "The numerical relationships between phytophagous insects and their hosts." *Sci. Monthly,* vol. 79: pp. 10-12, 3 figs. July 1954. Points out that Lepidoptera include over 40% of phytophagous insect species; lists nos. of spp. and of phytophagous spp. for principal insect orders. [P. B.]

Gillogly, G. M. & L. R., "*Trichogramma minutum* in Monarch Butterfly eggs." *Pan-Pacific Ent.,* vol. 29; pp. 111-120. 1953. Interesting observations on the parasitism of eggs of the Monarch by this tiny hymenopteron. [J. T.]

Gomes, Jalmirez G., "Resposta olfativa nas relacoes entre hospedeiros e parasitos" [in Portuguese]. *Bol. Fitossanit.,* vol. 3: pp. 1-6. "1946" [1947]. Summary of information on olfactory recognition of hosts by parasites, mainly of Lepidoptera. [P. B.]

Gonçalves, Cincinato R., "Males da carnaùba no Ceará e no Piaui" [in Portuguese]. *Bol. Fitossanit.,* vol. 3: pp. 145-170, 33 figs. "1946" [1947]. Insects attacking the palm *Copernicia cerifera*: records *Brassolis sophoræ, Opsiphanes inviræ, Sibine* sp., *Castnia* sp., and undetermined larvæ of Eucleidæ and Arctiidæ; describes and figures early stages of *Castnia* sp. [P. B.]

Hering, E. M., "Probleme der Xenophobie und Xenophilie bei der Wirtswahl polyphagen Insekten" [in German]. *Trans. 9th Int. Congr. Ent.,* vol. 1: pp. 507-513, 1 fig. March 1953. Suggests new terms with regard to biology of phytophagous insects: "xenophoby" and "xenophily", illustrated with leaf-mining Microlepidoptera and Diptera. [A.D.]

Langridge, D. F., "Wax moths in beehives." *Journ. Dept. Agric. Victoria,* vol. 50:

pp. 545-548, 554, 5 figs. Dec. 1952. Biology and control of *Galleria* and *Achroia.* [P.B.]

Petrova, N. A., "The oak measuring worm, a pest in forests of the Azerbaijan SSR" [in Russian]. *Lesnoe Khoziaistvo,* vol. 6, no. 4: p. 52. Apr. 1953. [Not seen.]

Rose, A. H., & J. R. Blais, "A relation between April and May temperatures and spruce budworm larval emergence." *Canad. Ent.,* vol.86: pp.174-177, 1 fig. 28 May 1954. Warm temperatures cause *Choristoneura fumiferana* larvæ to emerge earlier. [E.M.]

Ross, D. A., "Key to the puparia of the dipterous parasites of *Choristoneura fumiferana* Clem." *Canad. Ent.,* vol.84: pp.108-112, 15 fig. 9 May 1955. Keys and figures 15 spp. [E.M.]

Schätz, Willi, "Beitrag zur Kenntnis über *Epichn. pulla* Esp. (Lep. Psych.)" [in German]. *Nachrbl. Bayer. Ent.,* vol.3: pp.77-79, 86-89. 15 Aug., 15 Sept. 1954. Discusses the biology and redescribes moth and immature stages. [N.O.]

Schultz, V. G. M., "Neue Beiträge zur Schmetterlingskunde. 21. Wie finden sich die Männchen und Weibchen unserer Schmetterlinge? 22. Protogynie bei einer *Acalla hastiana* L.-Zucht. 23. Aus der Lebensgeschichte des Holunderzünslers *Pyrausta sambucalis* Schiff. 24. Beobachtungen, die mit den Angaben in der Literatur nicht übereinstimmen" [in German]. *Ber. naturwiss. Ver. Bielefeld,* vol.12: pp.30-52, 53-56, 57-60, 1 pl., 3 figs. 1952. [Not seen].

Snyder, Karl ., "The effect of temperature and food on the development of the variegated cutworm *Peridroma margaritosa* Haw. (order Lepidoptera, family Noctuidæ)." *Ann. Ent. Soc. Amer.,* vol.47: pp.603-613, 3 figs. "Dec. 1954" [18 Feb. 1955].

Somov, I., "Dynamics of seasonal increase of bollworm" [in Russian]. *Khlopkovodstvo,* vol.4, no.7: pp.60-64. July 1954. *Heliothis armigera.* [Not seen].

Stark, R. W., "Distribution and life history of the Lodgepole needle miner (*Recurvaria* sp.) (Lepidoptera: Gelechiidæ) in Canadian Rocky Mountain parks." *Canad. Ent.,* vol.86: pp.1-12, 15 figs. 29 Jan. 1954. Discusses history and extent of recent outbreaks, describes moth and its behavior, morphology and seasonal cycle of early stages, and effects of environmental factors on development. States 15 spp. of parasites are known from Canadian populations, lists 5. [E.M.]

Stultz, H. T., "Note on occurrence of *Agathis laticinctus* (Cress.) (Hymenoptera: Braconidæ) as a parasite of the Eye-Spotted Bud Moth (Lepidoptera: Tortricidæ) in Nova Scotia." *Canad. Ent.,* vol.86: pp.96-98. 10 March 1954. This parasite has recently increased greatly in incidence in *Spilonota ocellana,* probably as a result of change in spray practices. [E.M.]

Swezey, Otto H., "Forest entomology in Hawaii." *Spec. Publ. Bishop Mus.,* no.44: 266 pp., 32 figs. 2 Aug. 1954. List of insects attacking some 105 kinds of forest trees, with their distribution in the islands and some biological notes. The insects are listed only under host plants. [P.B.]

Tanada, Yoshinori, "A polyhedrosis virus of the imported cabbageworm and its relation to a polyhedrosis virus of the alfalfa caterpillar." *Ann. Ent. Soc. Amer.,* vol.47: pp. 553-574, 2 figs. "Dec. 1954" [18 Feb. 1955.] Virus disease of *Pieris rapæ,* apparently identical with one of *Colias eurytheme.* [P.B.]

Thompson, W. R., "Note on *Dichætoneura leucoptera* Johns. (Diptera, Tachinidæ)." *Canad. Ent.,* vol.85: pp.391-392, 1 fig. 21 Oct. 1953. Notes occurrence of 1st stage larvæ in hind gut of *Depressaria heracliana* and *Archips cerasivorana.* [E.M.]

Thompson, W. R., "The tachinid parasites of *Archips cerasivorana* Fitch. (1) *Dichætoneura leucoptera* Johns. (Diptera)." *Canad. Ent.,* vol.85: pp.19-30, 20 figs. 30 Jan. 1953. Describes and figures early stages and adults of this parasite, and discusses its habits and relationships. [E.M.]

Thompson, W. R., "The tachinid parasites of *Archips cerasivorana* Fitch. (2) *Eusisyropa blanda* O. S. (Diptera)." *Canad. Ent.,* vol.85: pp.393-404, 19 figs. 4 Dec. 1953. Discusses early stages, reproductive system, biology, and systematic relationships of *E. blanda.* [E.M.]

Thorsteinson, A. J., "The role of host selection in the ecology of phytophagous insects." *Canad. Ent.,* vol.85: pp.276-282. 16 Sept. 1953. Notes discrepancies between results of laboratory and field studies. Distinguishes host selection through oviposition response from that depending on feeding response. Notes steps in acceptance or rejection. Classifies host plants into unsuitable, attractive, and acceptable groups; notes 6 subgroups of acceptable plants, all with characteristics that inhibit successful feeding! Classifies phytophagous insects into polyphagous, oligophagous, and monophagous. Rejects Dethier's concept of chemical monophagy. Briefly discusses roles of food and temperature in modifying host selection. A mainly classificatory paper with few concrete examples. [E.M.]

Treat, Asher E., "A new gamasid (Acarina: Mesostigmata) inhabiting the tympanic organs of phalænid moths." *Journ. Parasitol.*, vol.40: pp.619-631, 4 pls., 2 figs. Dec. 1954. *Myrmonyssus phalænodectes* n.sp. described and recorded from *Leucania, Pseudaletia,* and 16 other genera of noctuids, in Massachusetts; the mite destroys the organs of hearing. [P.B.]

Tripp, Howard A., "Description and habits of the spruce seedworm, (*Laspeyresia youngana* (Kft.) (Lepidoptera: Olethreutidæ)." *Canad. Ent.*, vol.86: pp.385-402, 17 figs. 22 Oct. 1954. Records hosts and distribution; describes and figures adult, last-instar larva, and pupa; outlines life cycle; describes larval habits and behavior of pupæ. [E.M.]

Turnock, W. J., "Some aspects of the life history and ecology of the pitch nodule maker, *Petrova albicapitana* (Busck) (Lepidoptera-Olethreutidæ)." *Canad. Ent.*. vol. 85: pp.233-243, 6 figs. 23 July 1953. Discusses history and distribution in North America of this introduced insect; describes life cycle and injury to host, roles of species susceptibility, and of age, size, and isolation of trees in determining incidence and damage; and analyzes factors in natural control, of which maturation of trees is considered to be the most important. 11 hymenopterous and 1 dipterous parasites are reported. [E.M.]

Walley, G. Stuart, "Hymenopterous parasites of *Choristoneura pinus* Free. (Lepidoptera: Tortricidæ) in Canada." *Canad. Ent.*, vol.85: p.152. 15 April 1953. Records 13 spp., 9 of which are previously recorded parasites of *C. fumiferana.* [E.M.]

Walley, G. Stuart, "Notes on *Acrobasis rubifasciella* Pack. (Lepidoptera: Phycitidæ), with a list of its parasites." *Canad. Ent.*, vol.86: pp.255-260. 10 June 1954. Describes life cycle in Ottawa region, and lists 18 spp. of hymenopterous parasites, of the families Braconidæ, Ichneumonidæ, Perilampidæ, and Pteromalidæ. [E.M.]

Weidner, Herbert, *Bestimmungstabellen der Vorratsschädlinge und des Hausungeziefers Mitteleuropas.* 2nd ed. 234 pp., 272 figs. Jena: Gustav-Fischer-Verlag. 1953. [Not seen].

Wellington, W. G., "Atmospheric circulation processes and insect ecology." *Canad. Ent.*, vol.86: pp.312-333, 9 figs. 20 Aug. 1954. A fundamental paper; reviews principal air-mass types in North America; notes association of frontal movements with insect migrations and transport; discusses the value of air-mass climatology in interpreting insect mortality; describes systematic trends in cyclonic and anticyclonic centre tracks, and their possible uses in population studies. The possibility of using meteorological information to predict insect population trends is noted; the complexities inherent in such forecasts are emphasized. [E.M.]

Wood, G. W., et al., "Life-history studies of *Spælotis clandestina* (Harr.) and *Polia purpurissata* (Grt.) (Lepidoptera: Phalænidæ) in low-bush blueberry areas in New Brunswick." *Canad. Ent.*, vol.86: pp.169-173. 28 May 1954. Seasonal cycles of these single-brooded moths are outlined. [E.M.]

Wyatt, G. R., "The nucleic acids of some insect viruses." *Journ. Gen. Physiol.*, vol.36: pp.201-205. 20 Nov. 1952. Study of viruses from 9 spp. of Lepidoptera. [P. B.]

Zopp, Johannes, "Die ersten Stände von *Automeris* (*Hyperchiria*) *naranja* Schaus (=*aurantica* Weym., nec *umbrosa* Weym. et *ater* Conte)" [in German]. *Zeits. Weiner Ent. Ges.*, vol.38: pp.245-247, 1 pl. 15 Sept. 1953. Immature stages and biology. [N.O.]

G. PHYSIOLOGY AND BEHAVIOR

Ackermann, D., "Über biogene Amine der Seidenraupe" [in German]. *Hoppe-Zeyl. Zeits.*, vol.291: pp.169-176. 24 Nov. 1952. Amino-acids in larva of *Bombyx mori.* [P.B.]

Allegret, Paul, "Variations individuelles des facteurs d'excrétion protidique avant la mue nymphale chez *Galleria mellonella* (L.) [in French]. *C. R. Acad. Sci. Paris,* vol.238: pp.518-520, 1 fig. 1954. Pre-pupal nitrogenous excretion may take place entirely as silk, or with assistance of Malpighian tubules; in the latter case a prepupal disapause is necessary. [P.B.]

Allegret, Paul, "Influence de la retention expérimentale de la soie sur la metamorphose de *Galleria mellonella* (L.)" [in French]. *C. R. Acad. Sci. Paris,* vol.238: pp.623-625. 1954. If nitrogenous secretion by silk production is prevented by blocking gland duct, Malpighian tubules take over this function. [P.B.]

Arsen'ev, A. F., & N. V. Bromlei, "Chemical composition and buffer capacity of the intestinal juice of the larvæ of the Oak and Mulberry Silkworms" [in Russian]. *Dokl. Vses. Akad. Nauk im. Lenina,* vol.16: pp.25-31. 1951. [Not seen.]

Aruga, H., S. Kawase, & M. Akino, "Occurrence of an enzyme acting on xanthopterin-B in *Bombyx mori*" [in English, French summary]. *Experientia,* vol.10: pp.336-338, 1 fig. 15 Aug. 1954.

Arvy, L., "Données histologiques sur la leucopoièse chez quelques Lépidoptères" [in French]. *Bull. Soc. Zool. France,* vol.78: pp.45-59, 1 pl., 4 figs. 1953. The study of the different stages of five spp. *(Malacosoma neustria, Ephestia kühniella, Hyponomeuta padella, Thaumatopœa processionea, Bombyx mori)* shows the presence of leucopoietical, even, and symmetrical organs situated at the level of the mesothorax, metathorax, and the first 4 abdominal segments. These leucopoietical organs are found only in the larvæ, they disappear at the beginning of the pupal stage and are not found in the imago. In these spp. the blood is almost without leucocytes. [P.V.]

Babaian, A. S., & Mkrtumian, K. L., "The influence of host plants upon the development of *Agrotis ypsilon* Rott. and *Laphygma exigua* Hb." [in Russian]. *Izv. Biol. Sel'sk. Nauk Akad. Nauk Armianskii SSR,* vol.3: pp.491-494. 1950. [Not seen.]

Barsa, Mary C., "The behaviour of isolated hearts of the grasshopper, *Chortophaga viridifasciata,* and the moth, *Samia walkeri,* in solutions with different concentrations of sodium, potassium, calcium, and magnesium." *Journ. Gen. Physiol.,* vol.38: pp.79-92. 20 Sept. 1954.

Beall, Geoffrey, "Congregation of butterflies at hilltops." *Lepid. News,* vol.7: pp.43-44. 27 July 1953.

Beck, Stanley D., "Nutrition of the European Corn Borer, *Pyrausta nubilalis* (Hbn.). III. An unidentified dietary factor required for larval growth." *Journ. Gen. Physiol.,* vol.36: pp.317-325, 1 fig. 20 Jan. 1953.

Bergmüller, H., "Zur Zucht von *Macrothylacia rubi*" [in German]. *Nachrbl. Bayer. Ent.,* vol.2: p.87. 15 Nov. 1953. Observations in a breeding cage. [N.O.]

Bergold, G. H., "Demonstration of the polyhedral virus in blood cells of silkworms." *Biochem. Biophys. Acta,* vol.8: pp.397-400, 4 figs. Apr. 1952.

Bernheimer, Alan W., "Hemagglutinins in caterpillar bloods." *Science,* vol.118: pp.150-151. 8 Feb. 1952. Tests for hemagglutinins acting on human blood, in 46 spp. of caterpillars of 17 families; positive results in 10 spp. (all moths). [P.B.]

Bernheimer, Alan W., Ernst Caspari, & Armin Dale Kaiser, "Studies on antibody formation in caterpillars." *Journ. Exper. Zool.,* vol.119: pp.23-35, 1 fig. Feb. 1952. Experiments on *Platysamia cecropia* and *Citheronia regalis* indicate that insects do not form antibodies of the vertebrate type in response to the antigens used; this accounts for the free development of transplants in hosts of other species. [P.B.]

Bheemeswar, B., & M. Sreenivasaya, "Enzyme systems of the silk-worm, *Bombyx mori* Linn.: Part I — a preliminary study." *Journ. Sci. Indust. Res.,* vol.13B: pp.108-110. Feb. 1954.

Biliotti, Émile, "Importance et signification des arrêts de developpement au stade nymphal chez *Thaumatopœa processionea* L." [in French]. *C. R. Acad. Sci.,* vol.236: pp.1703-1705. 1953. Delayed eclosion in variable percentage of pupæ. [P.B.]

Bodenheimer, F. S., "Arrested development and arrested activity in insect life." *Trans. 9th Int. Congr. Ent.,* vol.1: pp.21-40. March 1953. An essay on various aspects of diapause in insects. [A.D.]

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J. MISCELLANY

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Skell, F., "Ludwig Osthelder, Regierungspräsident von Oberbeyern a.D., Ehrenvorsitzender der Münchener Entomologischen Gesellschaft" [in German]. *Nachrbl. Bayer. Ent.*, vol.3: pp.25-27, 1 portrait. 15 March 1954. Obituary of distinguished German lepidopterist. [N.O.]

NOMENCLATURE NOTICE

The Secretary to the International Commission on Zoological Nomenclature has announced an application for validation by the Commission under the Plenary Powers of the name *Dictyoploca* Jordan, 1911 (Saturniidæ). The file number of this case is Z.N.(S.) 1072 .The full application is to be found in the *Bulletin of Zoological Nomenclature,* vol. 13: part 2/3, published 29 March 1957. Any specialist who may desire to comment on this application is invited to do so in writing to the Secretary to the International Commission (Address: 28 Park Village East, Regent's Park, London N.W. 1, England) as soon as possible. Every such comment should be clearly marked with the Commission's File Number as given in the present Notice and sent *in duplicate.* Comments should reach the Secretary at the latest by 29 September 1957. — C. L. R.

NOTICES BY MEMBERS

Will purchase: cocoons of U.S. Saturniidæ, especially Cecropia and Polyphemus, pupae of Sphingidæ, and *Papilio.* Must be free of parasites. Also want fertile eggs of Sphingidæ. Eugene Dluhy, 3912 N. Hamilton Ave., Chicago 18, Ill., U. S. A.

Will have ova of *P. cecropia, P. rubra, T. polyphemus,* a few *A. io,* and others for sale, 30 to 60 cents per doz. Also large quantity U.S. Lepid. for sale and exchange. Mrs. Edith Lyle Ragsdale, 429 N. Marion St., Centralia, Ill., U. S. A.

For sale: Seitz' *African Rhopalocera,* complete with 80 col. plates, unbound, German edit. $35.50; Boisduval & Sganzin, *Faune Entomologique Madagascar, Bourbon et Maurice,* unbound, $15.00; Aurivillius' *Rhopalocera Aethiopica* (cover spotted) $7.50; *Bull. of the Hill Museum,* unbound, lacking Vol.2, no.4, Vol.3, no.4, and Vol.4, no.2, $35.00. Also have about 75 duplicate reprints to exchange with anyone interested. G. R. DeFoliart, 2108 Rainbow, Laramie, Wyo., U. S. A.

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CORRIGENDA FOR VOLUME 10

pp. 30-34: see pp. 213-214 for corrections.
p. 60, line 15 from bottom: "*A anaphus*" should be "*A. anaphus annetta*".
p. 64, line 30: "*C. crista*" should be "*P. crista.*"
p. 67, line 43: "Dal. Povonlý" should be "Dal. Povolný."
p. 69, line 6: "El barrenarod" should be "El barrenador."
[Correction for vol. 7: p. 60, line 4 from bottom: "vol. 13: pp. 30-31. 1 Dec. 1951" should be "vol. 14: pp. 30-31. 1 Feb. 1952"]

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EDITORIAL ANNOUNCEMENTS

The List of Members for 1956 is issued in mimeographed form and is being mailed with this issue. It includes new members.

Volume 11 will have a new printer. The change in printers was necessitated by delays and rising costs. It is expected that the *News* will be up-to-date and on a bi-monthly schedule within a few months.

C. L. Remington

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The object of The Lepidopterists' Society, which was formed in May, 1947, and formally constituted in December, 1950, is "to promote the science of lepidopterology in all its branches, ... to issue a periodical and other publications on Lepidoptera; to facilitate the exchange of specimens and ideas by both the professional worker and the amateur in the field; to secure cooperation in all measures" directed toward these aims (*Constitution,* Art. II). A special goal is to encourage free interchange among the lepidopterists of all countries.

Membership in the Society is open to all persons interested in any aspect of lepidopterology. All members in good standing receive *The Lepidopterists' News.* Institutions may subscribe to the publications but may not become members. Prospective members should send to the Treasurer the full dues for the current year, together with their full name, address, and special lepidopterological interests. All other correspondence concerning membership and general Society business should be addressed to the Secretary. Remittances in dollars should be made payable to *The Lepidopterists' Society.* There are three paying classes of membership:

Active Members - annual dues $4.00 (U. S. A.)
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Each year a list of members of the Society is published in the *News,* with addresses and special interests. There are six numbers in each volume of the *News.*

All members are expected to vote for officers when mail ballots are distributed by the Secretary each year.

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